

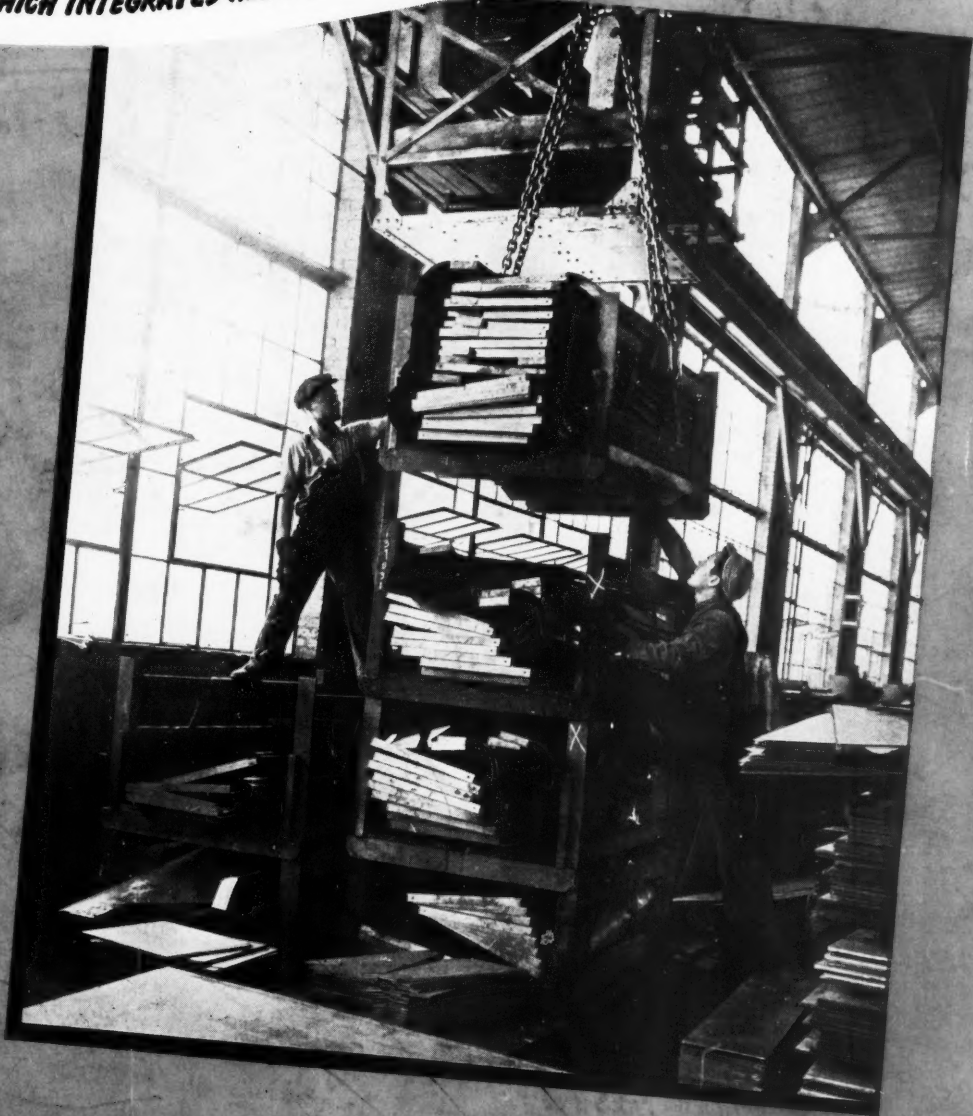
TECHNOLOGY DEPARTMENT

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Flow

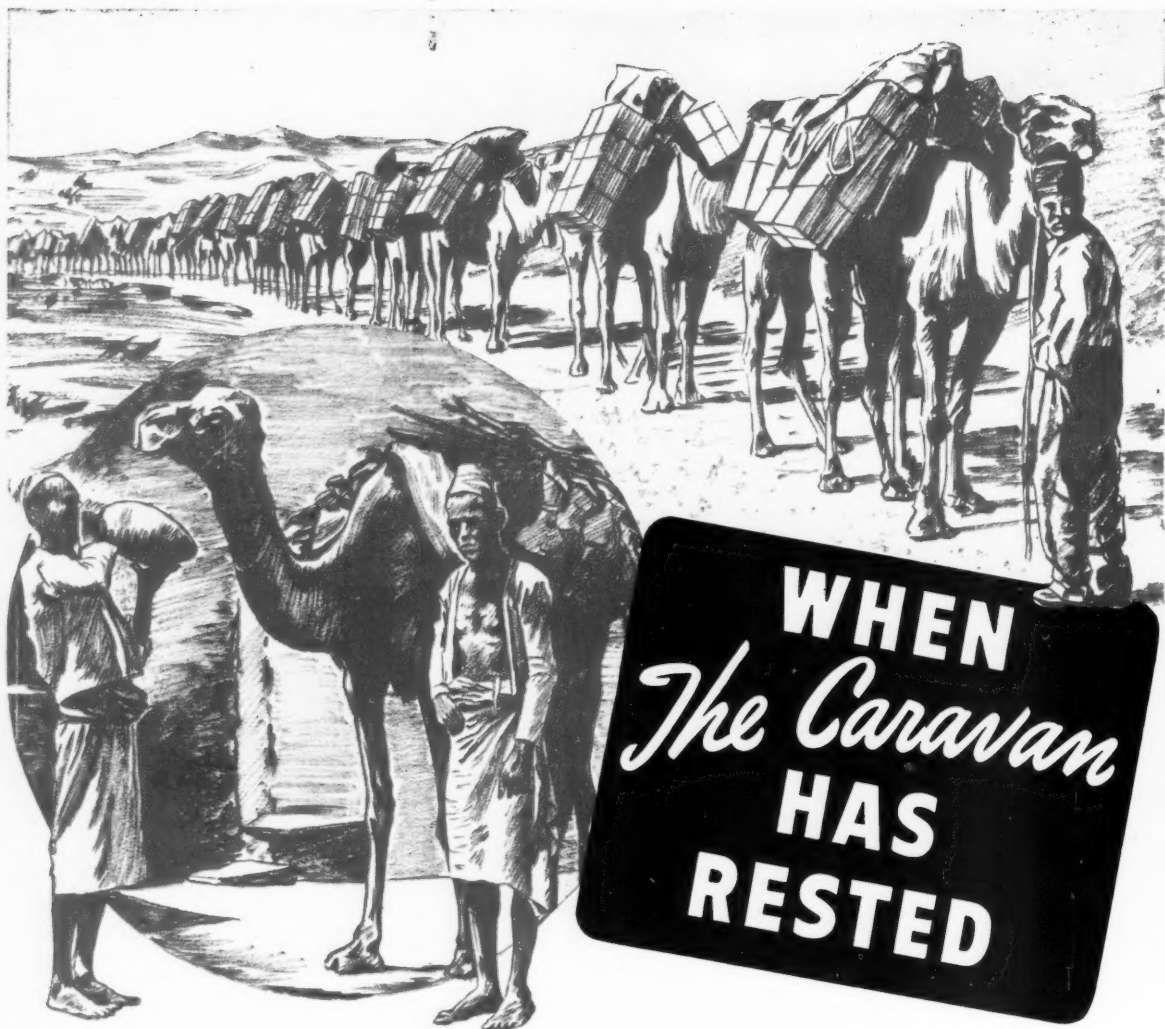
... THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTION

NOVEMBER
1946



SEE
the new

“WHERE TO BUY IT LOCALLY” SECTION



WHEN
The Caravan
HAS
RESTED

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\$775⁰⁰
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 Jackson, Michigan





I've cut my handling costs 60%
thanks to this A.T.C. specialist!

You May Save as Much or More ... Mail Coupon for Survey

IF I hadn't myself seen the savings banked every month, I would have said no business could save 60% just on handling materials alone.

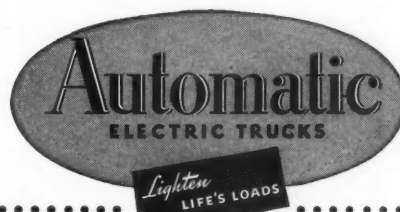
I was skeptical, but willing to be shown, when an A.T.C. SPECIALIST suggested our fixed material handling expense could be turned into a fixed profit. So without fuss or bother, he set about making his survey. In no time at all, he had it wrapped up. And what a package of material handling savings it promised—and DELIVERED!

Now we move our material into and out of our plant on brawny giants of electric power called Automatic Fork Trucks. Critical labor supply fairly itches to operate these material moving wonders that end back-breaking, gruelling toil. Where three to four men formerly used every ounce of energy in tedious, tiring, muscle work, one man now hauls more material, and with energy to spare at the end of the day.

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Give your business this chance to lighten labor's load and show amazing savings on the profit side of your books. The coupon brings an A.T.C. SPECIALIST ready to survey your material handling, without cost or obligation. Please mail coupon today.



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Div. of the Yale & Towne Mfg. Co.

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By..... Position.....

Street Address.....

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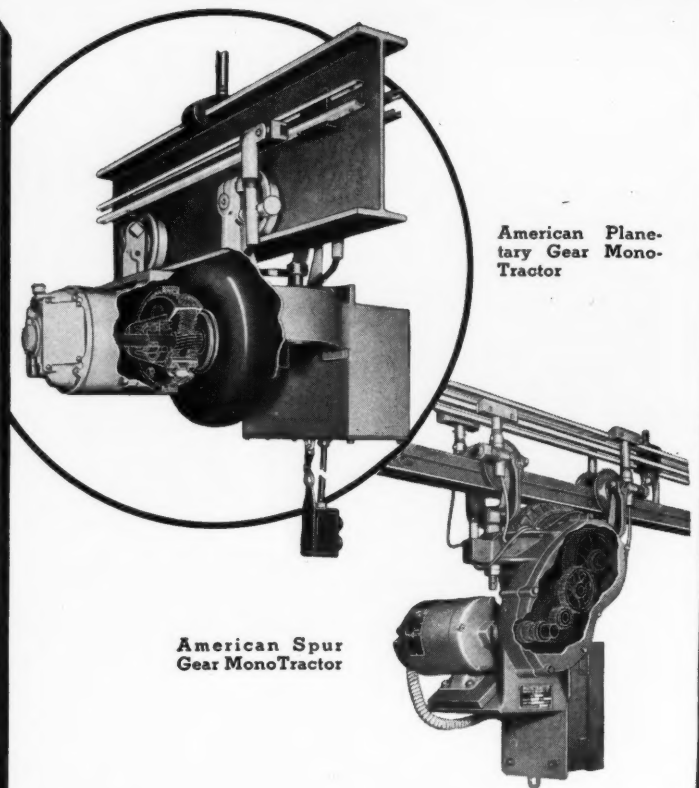
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book showing
successful ap-
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American
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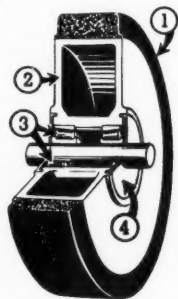
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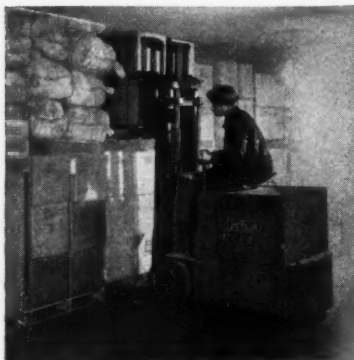
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Powerful "Jeep" handles heavy load of coiled strip with ease.



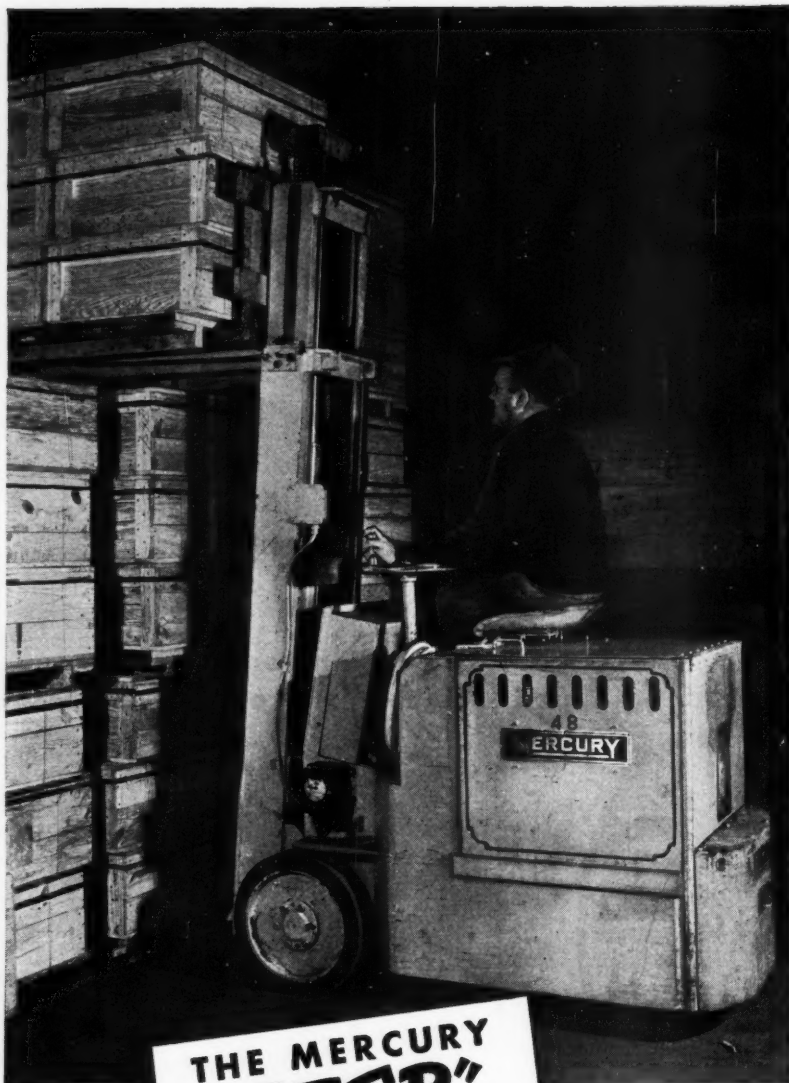
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"Jeep" loads live skid, a part of the Mercury "Trackless Train."



Displaying maneuverability that makes the "Jeep" a favorite with industry



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2000 Pounds Capacity

COMPACT, POWERFUL • EASILY MANEUVERED

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MERCURY

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NOVEMBER, 1946

Setting New Records

Gould Kathanode Batteries have a service life 80% longer than flat plate batteries

Leak-proof seal
instead of com-
mon bushing.

Durapor rubber
separators replace
wood type.

Double-wedge
grids replace
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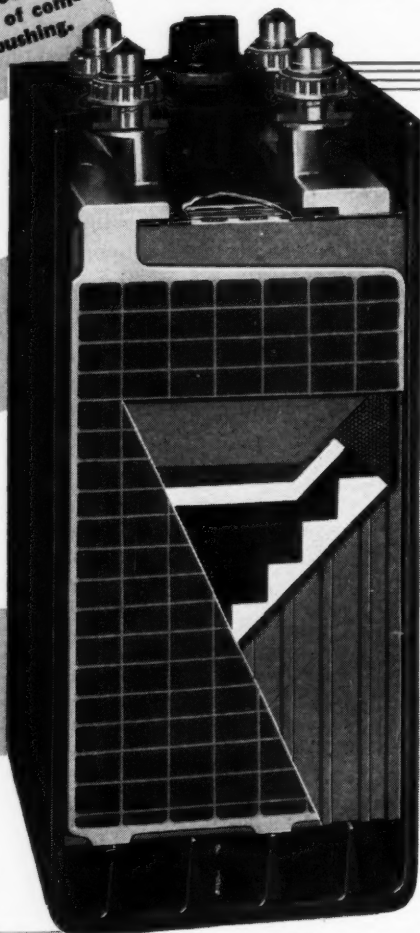
Black Oxide, a
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material com-
pounded by Gould.

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lope for extra plate
protection.

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replace ordinary
glass wool.

Monobloc con-
tainers of high
impact strength.

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active material
compounded by
Gould.



Gould introduced the Kathanode bat-
tery in 1925. Then, for the first time,
American industry had a battery that
would deliver 100% or more of rated
capacity throughout its entire service life.

Since 1925 every part of the Gould
Kathanode has been the subject of con-
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the improvements developed are listed
at the left. Together they mean that the
Kathanode of today not only has greater
capacity but maintains that capacity 80%
longer than ordinary batteries.

Longer service life means more work
done per dollar invested. Get the facts.
Write Dept. 711, Gould Storage Bat-
tery Corporation, Depew, N. Y., for the
latest Kathanode catalog.

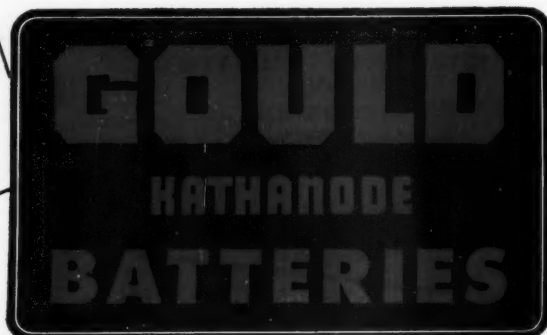
MEMO

*Purchasing Dept.
This is what
we've been
looking for.
Order Gould.*

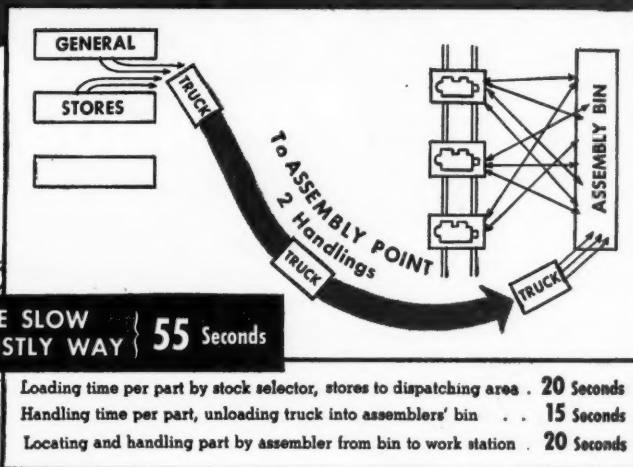
GENERAL MANAGER

**GOULD STORAGE BATTERY
CORPORATION, Depew, N. Y.**

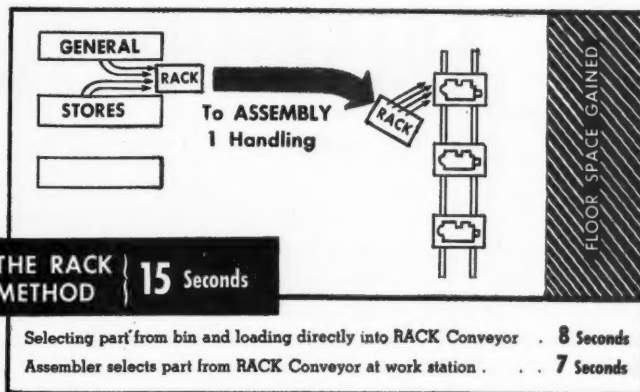
Service Centers: Atlanta • Boston • Buffalo • Chicago • Cincinnati
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How RACK CONVEYORS save 3 MAN HOURS per day -per operator-



NO MATTER WHAT
YOUR PRODUCT—
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ASSEMBLIES!



In this installation, six parts comprise an assembly unit. By saving 40 seconds on each part, 4 minutes were saved per unit. Since one operator assembled 50 units a day, 200 minutes were saved each working day per operator by the Rack method.

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6 of the 18 Rack Units Available

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3

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NOVEMBER, 1946

9



SALSBURY TURRETEER

Get the whole story on how the Turreteer can reduce your costs

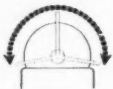
...write for Bulletin 4602-7

Do you want to cut the cost of horizontal handling? Would you like a truck that can do the work of up to six men with hand equipment...that's faster and more maneuverable than powered walking equipment or heavy-duty equipment? Then it will pay you to investigate the Salsbury Turreteer..

THE TURRET MAKES IT MORE MANEUVERABLE—For steering, the power unit and drive wheel rotate with



Salsbury 360° turning radius



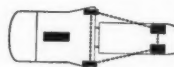
Conventional 200° turning radius

the turret—a full 360° turn. Turreteer turns in its own length.

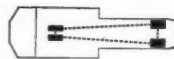
Reverses by changing direction of turret, so fast you don't even have to stop drive wheel. Such maneuverability saves time, means *more tons per hour*.

SALSBURY AUTOMATIC POWER UNIT MAKES IT FASTER—The Turreteer, with 4000 lb. load and driver, will operate 2 to 3 times as fast as comparable use equipment. Automatic clutch and automatic transmission permit constant motion without delays for gear shifting, automatically deliver power needed to take ramps in stride. Such speed means *more tons per hour*.

WIDE LOAD SUSPENSION GIVES IT MORE STABILITY—Exclusive Salsbury articulation provides 4-point load suspension based



Salsbury wide, 4-point load suspension



Conventional narrow load suspension

on four widely spaced wheels. No need to tie on loads for

operation over sharp changes in grade levels. Such timesaving stability means *more tons per hour*.

RIDING OPERATOR MAKES IT MORE EFFICIENT—No walking—no pushing—no fatigue. Operator can handle as many skids in last hour as the first. And this gas-powered truck is as simple to operate as any equipment made—just two controls: throttle and brake. No batteries to charge. Works 24 hours a day. Such efficiency means *more tons per hour*.

Be sure to write for Bulletin 4602-7

SALSBURY MOTORS, INC.



Pomona, California

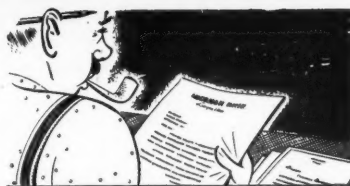
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Salsbury Turreteer—platform lift type • Salsbury Turretug—tractor type • Salsbury Turretruk—cargo type

Salsbury Turret Trucks

are available through any of the below-listed
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BIRMINGHAM—Rapids-Standard Co., Inc., 503 N.
20th St., 7-8337
BOSTON—H. G. Davis, Inc., 8 St. Mary's St., Ken-
more 5175
BUFFALO—Rapids Handling Equipment Co. of
Buffalo, 2327 Main St., University 2786
CHICAGO—Madden Equipment Co., 5107 S. Ash-
land Ave., Yards 3233
CINCINNATI—Oral T. Carter & Associates, 811
Race St., Main 2955
CLEVELAND—The Wallace Co., 1215 Sweetland
Bldg., Main 8431
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stone 5297
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4-0149
DETROIT—Bentley & Hyde, 7310 Woodward Ave.,
Trinity 2-1180
GRAND RAPIDS—Rapids Handling Equipment Co.,
100 Ionia Ave., S.W., 6-8674
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HONOLULU—Peter K. Schubert, 801 S. King, Hono-
lulu 59021
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Co., 1009 Baltimore, Victor 5977
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Third Ave., Mutual 8159
LOUISVILLE—Robert L. Schmitt Co., 130 N. Bay-
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Bldg., 5-2967
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National Ave., Orchard 7600
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Bldg.
NEW ORLEANS—Rapids-Standard Co., Inc., Room
407, Liberty Bldg., 315 St. Charles St.
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lantic 6860
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PORTLAND—Oregon Handling Equipment Co., 523
N.W. Glisan St., Atwater 5792
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way, Forest 7333
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Garfield 6126
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ond St., Sutter 1963
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3-6508
TULSA—Cant Manufacturers Representatives, 3012
East 15th St., 6-5752
VANCOUVER, B. C.—Handling Equipment, Ltd.,
1206 Homer St., Marine 9951



To FLOW:

Traveling Abroad

Please enter two subscriptions for the magazine FLOW, to be sent to our principals A. B. Byggekonomi, Celsiusgatan 10, Stockholm, Sweden. We also ask that you send them a complete set of all of the issues for 1945 and all issues published in 1946 up to the time that their subscription would go into effect.

In their letter to us our principals asked that we obtain information on new products for them on the following numbers listed in your special service called CATALOGUES feature in FLOW—35, 36, 37, 38, 39, 40, 41, 42, 45, 46, 48. Please send us the name and address of the manufacturer in each one.—Richard H. Lindblom, Products-From-Sweden, Inc., New York City.

It seems as if FLOW is rapidly becoming an "export" magazine as well. Subscribers' copies are being sent regularly to a number of foreign countries, including: Canada, S. Africa, Scotland, Peru, Palestine, Australia, Belgium, Brazil, Chile, China, Colombia, Switzerland, Mexico, Italy, England.—Ed.

To FLOW:

Birthday Greetings

Congratulations on the excellent job you have done in the past year with your new material handling publication FLOW. I consider it a very worthy addition to the material handling industry. I am attaching hereto my personal check for renewal of my present subscription.—Glen R. Johnson, Clark Tractor, Battle Creek, Mich.

Reader Johnson's wishes—like many others received—are sincerely appreciated. Last month's issue marked the beginning of the second year of publication for FLOW, which we observed with a piece in the department "On The Pallet." It has been an exciting year, traveling to all manner of plants in all parts of the country and seeing at firsthand the "inside workings" of

American industry. And noting the keen interest in material handling everywhere. It's this aliveness to the subject on the part of people in industry that speaks well for the continued growth of FLOW.—Ed.

To FLOW:

Thanks for the Compliment

The past several issues of your magazine have been carefully read by the writer who has enjoyed them very much.—Arthur Mason, Product Investigator, S. C. Johnson & Son, Inc., Racine, Wis.

To FLOW:

From Switzerland

We are in receipt of your letter as well as the two copies of FLOW magazine, issues for January and July, and wish to thank you very much indeed for the trouble you have taken in this matter. We have thoroughly studied the articles you indicated and can assure you that they were of great value to us.—E. R. Zingg, Zingg & Company, Berne, Switzerland.

Reader Zingg was interested in warehouse handling operations.—Ed.

To FLOW:

A Big Order

Thank you for informing us about the subscription rate for FLOW... We would like to have the magazine from the first issue (1945) up to the end of 1946.—E. Hemlin, Chief Librarian, Chalmers University of Technology, Gothenburg, Sweden.

Sorry, the heavy demand for extra copies has made our backnumber file incomplete.—Ed.

To FLOW:

"Paying Dividends"

I have been following with a great deal of interest the FLOW magazine, and sincerely compliment you on a job well done. FLOW ideas are paying dividends.—Guy W. Hughes, Director of Institute Promotion, American Institute of Laundering, Joliet, Ill.

To FLOW:

Going To Exposition

The writer plans to attend the National Material Handling Exposition as outlined on page 19 of the

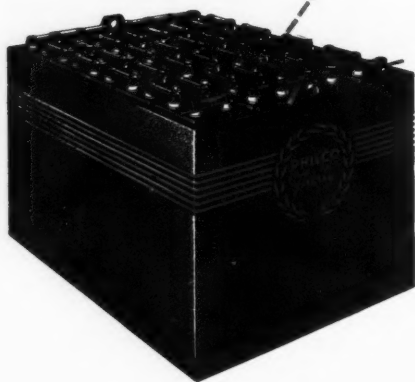
(Turn to page 48)

Get the 10% Extra Capacity in

MODERN PHILCO BATTERIES



For hard continuous work, Philco pioneered the modern extra capacity battery that provides 10% additional capacity with no increase in overall dimensions. This great advantage was first made available in Philco Type XL and XVL Batteries, and is an outstanding feature of the famous Philco "Thirty" ... the battery with 30% longer life. For today's heavier work schedules, make sure of *all* the capacity you can get. Specify a modern Philco. Write today for new catalogs.



PHILCO CORPORATION • STORAGE BATTERY
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TRIAL STORAGE BATTERY DEVELOPMENT

Flow

The magazine which integrates material handling equipment into the flow of production.

Vol. 2, No. 2

NOVEMBER
1946

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COVER PHOTO—Up to a height of 10 feet go small sheared parts loaded in these stacking racks, here being tiered by crane to conserve valuable floor space. The racks are also equipped for handling by powered truck. See these and other details in article starting on page 16.

Your Material Handling Show

IN October FLOW devoted its front cover and an inside feature page to the announcement and promotion of the coming Material Handling Exposition in Cleveland, next January. Last month FLOW followed up with reminders. We have been asked many times why we have taken such a prominent part in the promotion of this exposition, so we want to state our position quite clearly in this matter.

Any trade paper worth its salt has a primary obligation to its readers. The readers of FLOW Magazine are men in industry who have very serious manufacturing problems. Industry needs material handling education now, as never before in its history. Labor costs are continuing to rise. Material costs will not come down. In some industries, price ceilings are still in effect. In every industry, basic economic laws which limit the ability of markets to consume extraordinary high-priced merchandise are operating.

Therefore, it is necessary that industry keep its merchandise price lines down as much as possible. Expenditures of large sums of money for productive machinery cause only infinitesimal savings. But by the simple procedure of effecting economies in the handling of work in process, large savings can be made. Industry is becoming more aware of this daily. Industry is also aware of the fact that from 10% to 40% of the manufacturing costs is represented in the handling costs of a product.

Hence management must pay close attention to the handling methods in the plant. We believe that the first National Material Handling Exposition is going to help industry to accomplish these savings. A program of outstanding authorities in various industries will present facts on how such savings can be made. The entire Public Auditorium in Cleveland will be devoted to the latest types of material handling equipment. Manufacturing executives cannot help but benefit from an exposition of such magnitude. A single new idea gained from either the technical programs or the equipment displays can mean tens or hundreds of thousands of dollars to a plant.

These are the reasons why FLOW is promoting the first National Material Handling Exposition. We urge you to plan to attend it because we know that you will benefit from it. This is not just another exposition. It is a discussion of the most important subject on any manufacturer's agenda. If American industry is to survive it must lower its manufacturing costs, and it must lower its distribution costs, or the American standard of living, the American profit system, the American system of free enterprise will be greatly affected. American industry cannot afford to have any single element in its manufacturing processes be as inefficient as many of the present-day material handling methods are.

We don't think that any better reasons could be given for promoting the first National Material Handling Exposition.

Living B. Hexter
PUBLISHER

NATIONAL MATERIALS HANDLING EXPOSITION

"FOR THE BENEFIT OF THE ENTIRE INDUSTRY"

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T. O. ENGLISH
Aluminum Company of America

As you know, the first national Materials Handling Exposition will be held in Cleveland, January 14 - 17. Since this is the first show of its kind ever to be held in America -- a show in which all divisions of the materials handling industry will be represented -- the objectives of the Exposition should be clearly set forth for the benefit of all those who might be interested.

The purpose of this Exposition is to acquaint American industry with the latest and best methods of production and distribution through the adoption and application of modern materials handling equipment and practices.

We want to assure you that no segment of the materials handling equipment business will be favored over any other segment or group in the industry.

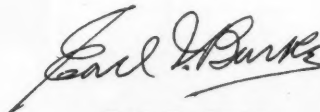
It is important to know, too, that no individual nor company in the industry will profit financially from the operation of this show.

Inasmuch as the Exposition is designed to serve the best interests of the entire industry, it will best succeed with the full cooperation of manufacturers of all types of equipment and services, including preparation, packaging, securement, protection, identification, and the like.

As users, we are interested in seeing that the above stated purposes and objectives are realized for the benefit of the entire materials handling equipment industry.

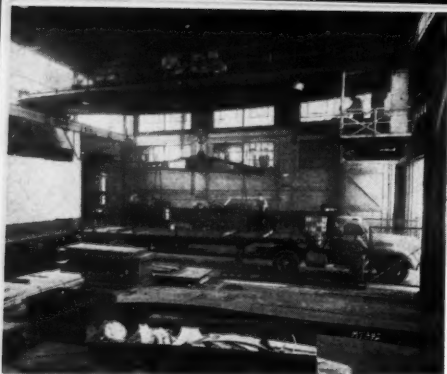
We know you will agree with us that it is to the advantage of everyone concerned to make this Materials Handling Exposition as comprehensive and inclusive as possible.

Very truly yours,



Earl I. Burke
Chairman, Policy Committee

PUBLIC AUDITORIUM • CLEVELAND • JANUARY 14-17, 1947



RUGGED

and yet

So Gentle

By use of cranes—rugged for heavy lifts, and gentle in exacting positioning tasks—costly stainless steel assemblies are handled with care at The Heil Co. From the raw material stage to shipping of the milk storage tanks, cranes perform all major handling and transfer operations, including positioning tasks that require considerable skill.

WHEN your steel raw material costs upward of \$1,000 a ton, protection in its handling is an absolutely vital necessity, from receiving to shipping of the finished

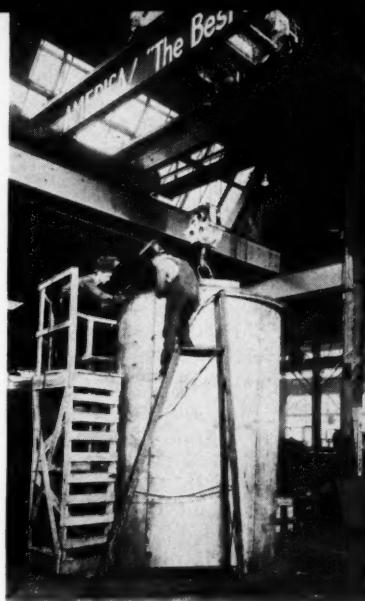
product. The costly stainless sheet steel used by The Heil Co., Milwaukee, in the fabrication of milk storage tanks is receiving the necessary careful handling by use of cranes. This crane handling, which effectively uses overhead space, is required by the large and bulky assemblies; the cranes also make possible a smooth flow of the sizable units through the production line, avoiding floor congestion. Some of the tanks may be 24 feet long and measure more than 10 feet in diameter.

By use of spreader beam and V-type hooks, crane moves long lengths of steel to storage in bay, upper left.

Conserving floor area, middle left: you can see the value of these stacking racks using vertical space.

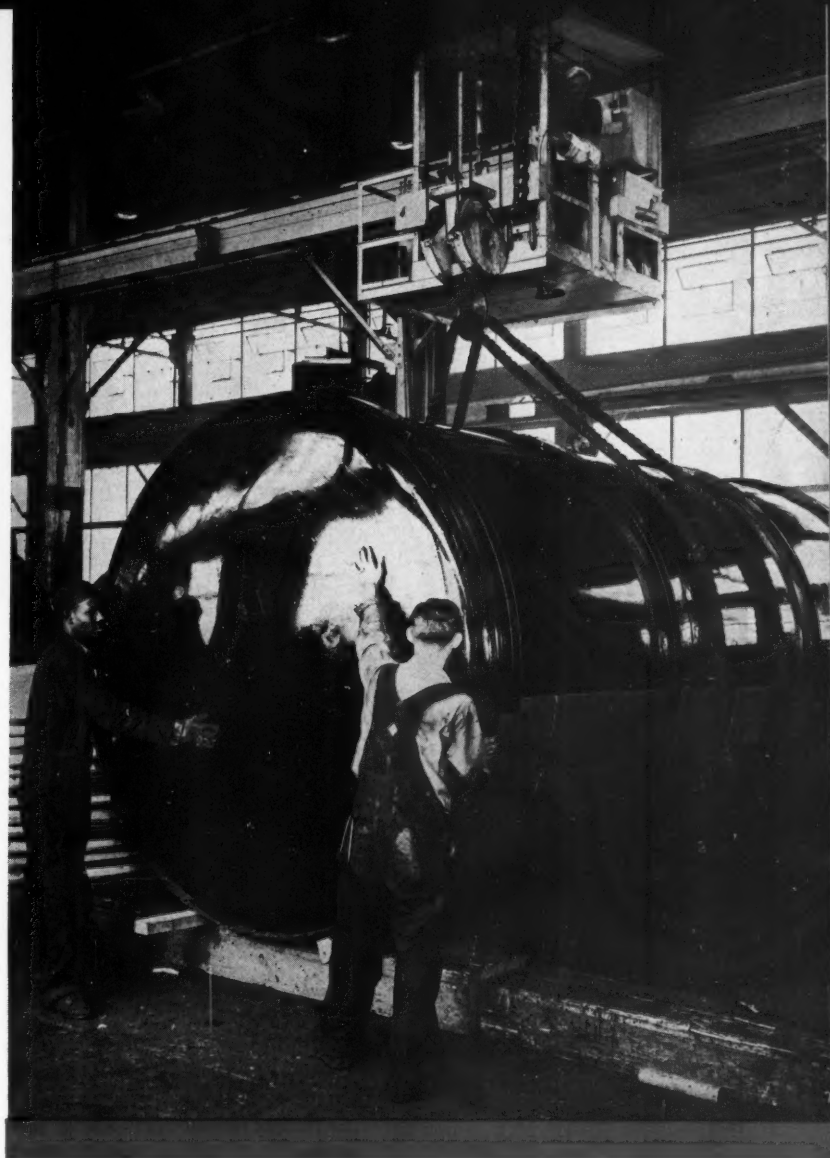
Hoist feeds 24-foot welded stainless steel sheet to rolling machine, lower photo, and crane holds emerging formed sheet safely, upper photo, preserving tubular form.





Assembly: top head is positioned for welding. Lower head is then slid under while crane lifts the whole structure.

Positioning: tank rolls when crane lifts it with sling applied off center, thus bringing areas in reach of operator applying the cork insulation.



Incidentally, while The Heil Co. is known for its road machinery, bottle washers, truck dump bodies and other types of equipment for home and industry, it has an equally well established reputation as specialist in the production of stainless steel milk tanks, both trailerized and stationary storage types. The company manufactured the world's first stainless milk transport tank in 1927, and has been building two out of three used in the U. S. ever since. Shortly after followed stainless milk storage tanks, which are the subject of this article.

U-Shaped Flow

As can be seen from the diagram on these pages, the layout of the department is U-shaped. Raw ma-

terial is received at one end of the north bay, in which is also located the storage area and the initial processing stations; the material then advances through operations located in a lateral connecting aisle, and from here through a third bay (during final assembly and finishing) that is parallel to the first one mentioned. Parts destined for other products—such as road machinery or trailerized milk tanks—are also transported by the same cranes through the first two bays in this layout to other production departments located in adjoining sections of the plant. Thus the cranes involved here also perform numerous load carrying tasks

in connection with products not concerned in this article.

The sheet steel arrives either by truck or freight car under the 50-foot span of a traveling bridge crane of 10-ton capacity. Two of these cranes service this bay. One of them is also equipped with a three-ton auxiliary hook, which is used for the lighter lifts. This is both an operating convenience and economy, since numerous smaller loads must be transferred throughout the day. It is interesting to note that The Heil Co. uses this combination of two cranes (one with a three-ton auxiliary hook) in each of the numerous bays throughout the plant where crane handling

is indicated by the size and weight of the product. The overhead is approximately 50 feet and the

a crane will position the heavy sheets in vertical racks close by the shears, and the material is

either for crane or fork truck handling.

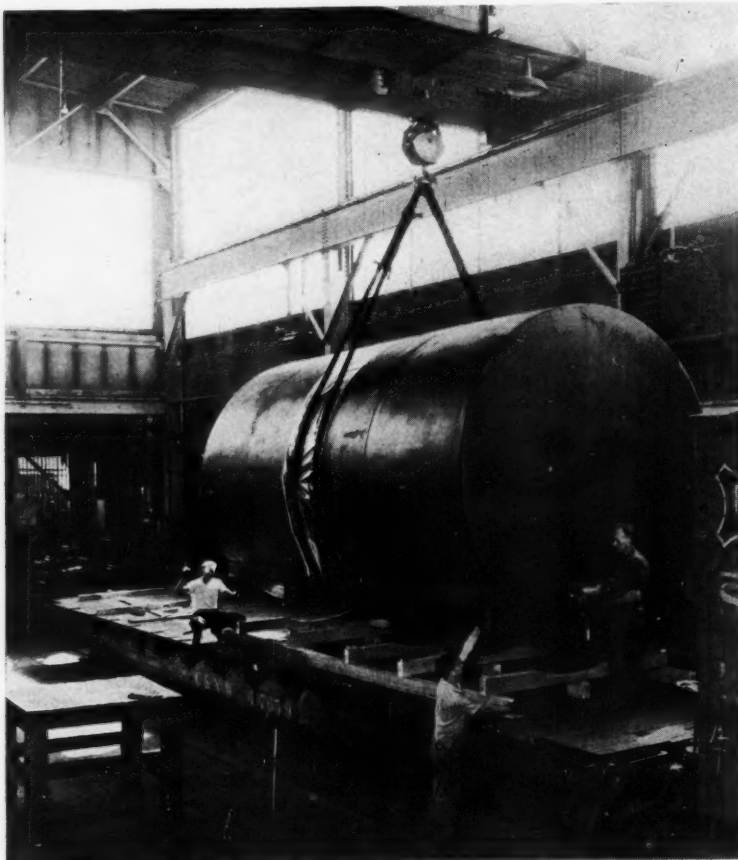
The racks are usually stacked four high, thus using vertical space up to 10 feet for temporary storage of small parts. The equalizer plates welded to each side of the rack are for attachment of the bridle chain hooks, and under-clearance is provided for truck handling. These racks are of all-welded construction and made of channel and angle iron. The dimensions are approximately 42 inches wide and 72 inches long. A stake pocket in the center at each end is for the purpose of separating pieces of different types or sizes. An angle is welded to each end and sides so that boards can be inserted to make an enclosed box when necessary. The bed is made of planking, which provides a non-slip surface for metal parts. In areas with heavy floor traffic these units are usually transported by one of the cranes.

Beyond the shears (in the north bay) is the layout department, where the material for the smaller subassemblies is laid out before it goes to the brake or burner (located at the end of this bay). It is only a short move from the layout department to the burning machine, where the parts are burned to the necessary size.

Since many small pieces are handled between these stations, a flanged-wheel transfer car is used at this point. An interesting feature of this car is the adjustable extensions which can be extended longitudinally approximately three feet at each end of the bed. The extensions are used for extra long sheets of stainless steel, and the additional support prevents whipping or dragging of the expensive material. Thus the transfer car makes it unnecessary to use the cranes for numerous lifts of small parts. However, when a heavily loaded car is to be moved from the layout department, the crane at this end of the bay will be hooked on and move the entire load.

Careful Handling—Skillful Positioning

As previously indicated, processing of the stainless steel sheets begins in the bay that forms the
(Turn to page 38)



Shipping: finished tank lowered on flat car mounting. Cranes do safe handling job throughout.

length of the bays averages 225 feet.

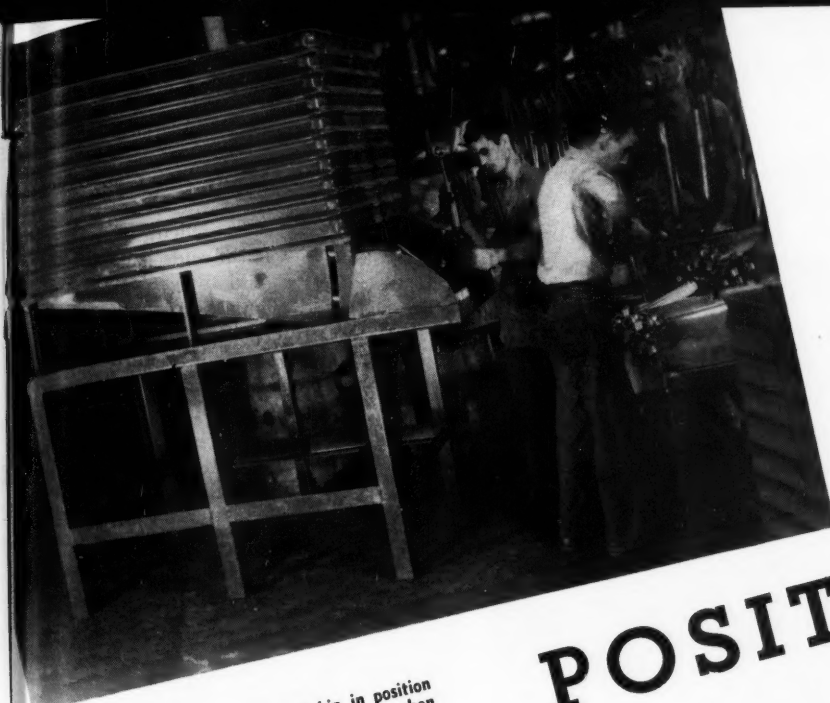
The lifts of steel are removed by means of chain slings and the type of V-shaped hooks shown in the photos. Hooks of this type are available in a number of sizes for lifts of various weights. Long lengths of sheets or plates—measuring from 20 and up to 40 feet—are lifted by use of spreader beams. A sheet grab or lifter is employed for thin-gauge material.

Overhead Handling in Production

The storage area is adjacent to the shears located in the same bay, where the heavier sheets (of common finish steel) are positioned in the machines by means of jib hoists. A considerable proportion of common sheet and plate steel, incidentally, is used in the fabrication of the outer tank walls. Usually

then handled through shearing by the hoists mentioned, using jack hooks for lifting the sheets vertically from the racks. Stainless steel sheets, which are processed in the lateral bay that forms the base of the "U", are transferred by crane from storage under the span of the crane operating in that bay. The large sheets are then positioned for joining at the welding station.

Floor area is necessarily at a premium in a busy plant like this one. Hence no opportunity is overlooked to utilize vertical space in order to conserve all possible square footage for production. An example is the employment of stacking racks in the shearing department, where many small pieces of irregular shapes are cut. These are put into the type of stacking rack shown in one of the photos. These containers are constructed



This is the "no-stopping" bin in position on the frame. Parts flow into spout when the bottom is dropped. Note convenient working level for men.

POSITIONED for PRODUCTION

Production has increased remarkably by use of drop-bottom skid bins which position assembly parts. In shipping, adoption of strapped unit packages has created startling savings in man-hours and load capacity.

THE principal item made in Plant No. 1 of the Monroe Auto Equipment Company, Monroe, Mich., is shock absorbers, which are produced by the thousands daily for many of the country's automobile manufacturers. The assembly of these units involves the handling of a large volume of relatively small piece parts. These must be positioned at work stations in the line so that they can be removed with minimum effort by the operators. When skid bins are placed on the floor, assembly operators are required to stoop for every piece. And such stooping tends to tire workers as well as to retard production.

Consequently company engineers designed a drop-bottom skid bin and a specially constructed positioning frame, shown in one of the photos. The use of this two-

part unit has minimized the fatigue factor, eliminated excess handling, and thus increased production by some 30 per cent.

Positioning for Minimum Effort

As indicated, the specially designed skid bin and frame make up the complete unit. The corrugated metal bin is about 42 inches wide, 60 inches long, and 30 inches deep. The bottom is corrugated as well as the sides, and the legs are constructed of welded, shaped channels. The bin bottom is hinged at one end, and at the other it has a locking arrangement for dropping. The opening at this end is about 10 inches. With an underclearance of 12 inches, the units are picked up and moved by highlift powered trucks.

When the material is needed for

assembly, the loaded bins are placed on the frames which are positioned at the desired points along the line. As can be seen from the photo, this unit is constructed of shaped channels and welded angle irons. The photo also shows that the material is thus placed at hand height of the assembly operator.

When the bin has been spotted on the frame, the front end of the bottom is dropped by simply turning a lever. The material then flows

into the spout attached to the front end of the frame. Incidentally, the corrugations in the drop-bottom are lengthwise to the bin, which aids the flow of the material into the spout when the front end is dropped.

Certain features of the frame should be pointed out. One of these is the size of the spout at the head end. Its depth of 24 inches (40 inches wide) provides an area large enough to accommodate a sufficient number of parts so that the operator is supplied with material during the period while the empty bin is being removed and a full one brought in. This construction feature eliminates the possibility of waiting time between exchanges.

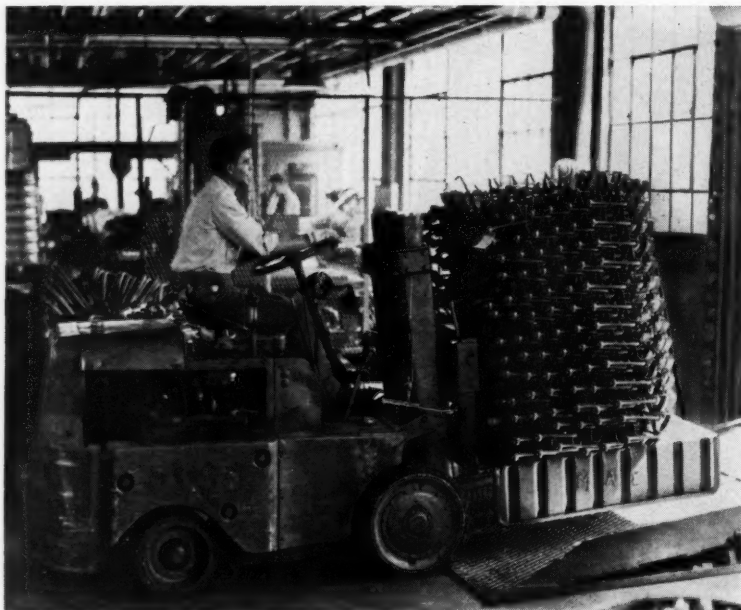
Other points of interest concern safety factors. In spotting the bin on the frame the truck operator slides the load into place from the rear toward the front. Gusset plates welded to the spout end, one on each side, serve as a safety stop during this operation. Thus the unit cannot be slid off or positioned improperly in the lengthwise direction. Another safety factor is the angle irons at both sides of the

frame, which prevent sideways slip of the bin once it has been put into place.

A final point concerns the top edge of the spout, over which the operator must constantly pass his

Castered Storage Bins

In passing, a slightly different type of container used by the company may be briefly described. These are storage bins mounted on



Formerly shipped in bundles of five to 10 each, these sway bars are now arranged for shipping in strapped unit packages of 400 to 600 per skid load.

hand in reaching for the pieces. This edge is doubled back on itself, avoiding a sharp projection. The resultant smooth, rounded edge does away with the possibility of the operator's scraping or cutting his hand.

From the standpoint of production, of course, the important point is that the operator merely reaches over to remove a part. He does not have to stoop, which is as awkward as it is tiring. And a tired operator is not a productive one. Another way of putting it is this: if a worker spends as much, or more, time in stooping as in assembling, a considerable part of his pay is actually for time spent in unnecessary handling, adding to the production cost per unit.

This is a simple statement of the dollars-and-cents arithmetic of inefficient handling in the production line. The 30 per cent increase in output in this particular operation—the direct result of proper positioning of the work—makes clear what can be accomplished when an operator's time is not taken up with fatiguing incidental handling tasks.

casters, with a welded subframe which is also constructed of angles and shaped channels. These mobile containers have a capacity of approximately 20 cubic feet and are used for temporary storage of such small items as brass fittings. The rigid bottom has a slope of about 30 degrees; and the spout, as in the case of the drop-bottom bins, is likewise at working height.

These units, which are of one-piece construction, have the advantage of ready mobility in addition to easy positioning of the parts. For on short moves the castered containers can be pushed by hand from station to station. For longer moves, they are picked up, either from the ends or from the sides, by fork truck.

Ingenuity and Standard Equipment

The Monroe Auto Equipment Company's Plant No. 4 affords another illuminating example of the economies and efficiencies possible when study is devoted to an unsatisfactory situation. Here the problem was one of packing and

shipping sway bars, irregularly shaped pieces made of round stock of varying diameters. Their weight ranges between five and nine pounds each. Averaging about 36 inches in length, some of these components resemble a broadened "U", with attachments at the ends while others have curves and angles. The daily output of Plant No. 4 comprises many thousands of these units, which are shipped to automobile assembly plants in Detroit and other areas.

Previously the sway bars were tied in bundles of five to 10 each, depending on their size and weight, and were thus loaded loose in highway trucks or trailers. This method had two main drawbacks. 1. Three men were required for tying and loading the numerous bundles. 2. With this method, about 1,000 sway bars made up an average truck or trailer load. The bulk was there, but the weight wasn't. Thus the trucks, filled with the bulky bundles, left the plant with only a fraction of their load capacity utilized.

Following a study made several years ago, company engineers worked out a unit package, for which nothing more is used than a standard type flat skid and steel strapping. A powered platform truck moves the loads to the outbound carriers.

Today, three of four bundling and handling operators that were formerly required are employed in productive tasks. Today, one man does the whole packing job. He is the finisher at the end of the production line. In disposing of the bars, he stacks them in interlocking pattern on the skid placed adjacent to his station. Today, depending on the size of the individual sway bars, from 400 to 600 are loaded on a single skid (see photo), and the load is then secured with one or two lengths of $\frac{5}{8}$ inch steel bands applied at right angles to the bars, as shown. An average trailer truck will accommodate up to eight of these skid loads. This means a total of from 4,000 to 5,000 sway bars and more per truck, as compared with the 1,000 that could be loaded when the material was shipped in loose bundles. Thus proper advantage is taken of load capacity, and at the same time 75 per cent of the bundling and han-

(Continued on page 45)



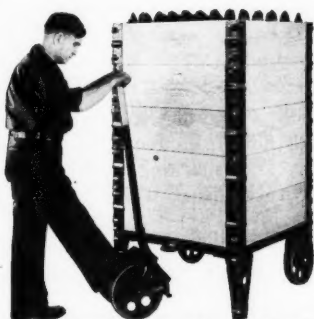
TEAMWORK

*is as vital in your plant
as on the football field!*

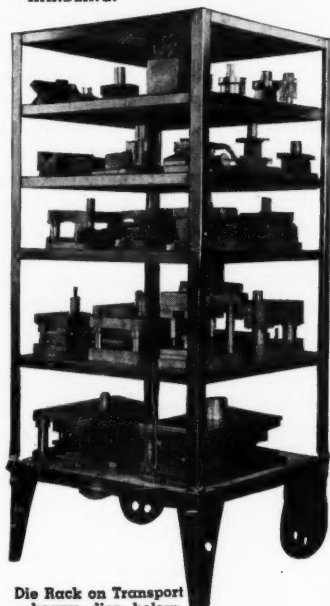
THE TURNER SYSTEM OF MATERIALS HANDLING

works WITH equipment best adapted to your operations

Hand Jimmy • Power Lift Truck • Crane or Tractor



Bin Sections (wooden side or all-steel) Racks, Trays and Die Tables fit on the Transport which is moved by hand "Jimmy," power lift truck, crane or tractor. Cuts labor costs in a big way. "DELIVER THE BIN AND SAVE THE HANDLING."



Die Rack on Transport—heavy dies below, lighter dies above.

Here is the EFFICIENCY-INCREASING TEAM MATE for all modern methods of shop transportation. The Transport, fitted with any of the many utility units, may be used with platform or fork lift trucks, cranes, overhead conveyors or tractors.

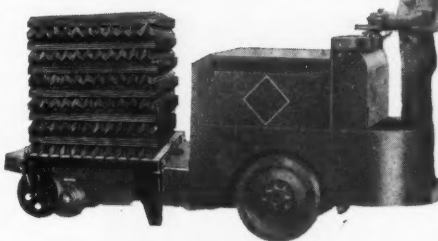
Save Time, Labor and Space with These Features of the Turner System

1. The Transport (see lower right) is half truck and half platform—has advantages of both, the disadvantages of neither.
2. Vertical expansion of loads saves valuable floor space. No "stooping or diving" into bins because sections are put on or taken off as needed.
3. The system puts all materials within arm's reach of operator—no walking back and forth.
4. All units ruggedly constructed—last indefinitely. All are riveted or welded—no bolts, nuts or screws to come loose.

60 DAYS FREE TRIAL in Your Plant

Send at once for an assortment of standard units. Keep them two months. Return them if not more than satisfied. Trial costs you nothing except transportation charges.

Write Today for this Assortment. Complete data on the TURNER SYSTEM will follow immediately.



Shelf Racks on Movable Transports. Quickly moved wherever needed.



Bin Sections, Shelf Racks, Die Tables, etc., fit on Transport. Floor Plate Deck Transport (shown) is one of several types.

FACTORY SERVICE COMPANY

4611 NORTH TWENTY-FIRST STREET

MILWAUKEE 9, WISCONSIN

IN PACKAGE RECEIVING . . .

It's Mobility

"Keep everything rolling on wheels"—the principle observed in the receiving operation of The Halle Bros. Company Department Store. Daily thousands of packages are kept "rolling" by means of a variety of castered equipment—with minimum handling.



THE particular method of handling incoming packages in a department store depends, just as it would in a manufacturing plant, on a number of factors. It depends on the adequacy of existing buildings in relation to the volume handled; the layout and the amount of space available, and the proximity of the receiving platform to the checking and marking departments. Moreover, as one Halle Bros. executive pointed out, the receiving and recording operations must be integrated with the particular store operation.

Layouts designed 10 or 20 years ago (adequate for the volume at that time) would not be considered "the last word" in light of present needs. Hence the method employed in a new building with a mechanized system for receiving installed in a specially designed layout, would be of no help to a store whose existing space and layout limitations must await new building construction or revision. In either case, however, the trick is to adapt available material handling equipment to present layout in

such a manner so that packages will flow from receiving to checking and marking (and beyond) with the least waste motion and cost.

Simple Numerical System

The handling methods used in the receiving operation of The Halle Bros. Company Department Store are noteworthy for their mobility and flexibility. In existing buildings that have served a number of years a large flow of packages is maintained with noticeable absence of rehandling and backtracking. Through checking and marking, stationary equipment is avoided wherever possible, and castered table trucks and mobile cages are adapted both to layout and handling needs.

Over 1,000 shipments are handled daily—and a shipment may be anything from a carlot to a ½-pound package. While incoming packages are routed from the main receiving platform to three separate buildings connected by passageways, this description deals with

1. Identified, recorded packages on flat truck go to receiving-sorting department by elevator.

2. Small parcel-post packages arrive for sorting in large wire cages. Note hinged side and top.

3. Sorted merchandise is unpacked and loaded on castered table-truck from departmental bins.

the handling in the main building which is typical of the others.

Shipments are received by over-the-road truck in the following classifications: express, parcel post, city delivery and freight. A numerical system is used to identify the packages accordingly. The lines on the receiving record form are numbered in a column on the extreme right-hand side, thus: from one to 25 for freight; from 26 to 50 for express; from 51 to 75 for parcel post, and from 76 to 99 for city deliveries. Each page of the record sheet is likewise numbered, and this numeral is used as a key figure before the one identifying the type of shipment. For example, 132-20 would thus be a freight shipment which was recorded on page 132 of the receiving record. In the case of freight shipments, the numbers are placed on the arrival notices. Because the company operates three connected buildings, further identification is necessary to indicate the building to which an arriving shipment is to go. Hence the individual packages are marked with numbers which give this information. As an example, all packages marked with figures in the 500 series are identified as going to the annex. The main point here is that each building be indicated with a figure which will be simple and avoid any possibility of confusion.

After the packages have been recorded and identified, they are segregated according to destination and type of shipment and are then placed on four-wheel flat trucks for movement to the sorting and receiving department. These trucks are about five feet long and are equipped with swivel type casters for easy steering. The loaded trucks are pushed a short distance to the north end of the platform where the doors of two freight elevators are located. One elevator is of $2\frac{1}{2}$ -ton capacity, the other of $1\frac{1}{2}$ -ton capacity. (One elevator serves the traffic going to one of

the adjoining buildings.)

It should be mentioned that large and bulky shipments for future use—furniture, for example—are delivered directly to the company's warehouse where a similar recording system is used. Parcel post packages are on the other extreme of the scale. These small units are placed in the type of castered cage with woven wire sides shown in one of the photos. This container has a hinged side and top and can be locked. Its dimensions are approximately: 5'6" high, 4' long, and 3' deep. These cages as well as the flat trucks arrive via elevator in the sorting and receiving room located on the ninth floor of the main building.

Keeping the Packages Rolling

After the entering operation, the parcel post packages are sorted out from the cages onto shelves located near the elevator entrance of the room. This temporary "stop-over" serves as a convenience while the packages are being recorded. When the packages are ready to move to the various checking bins around the room, the material is loaded on the castered double-deck table trucks shown in the photos. The merchandise is arranged on these carriers in such a way that the operator makes only one trip to the various bin locations, avoiding extra trips. These double-deck trucks are well suited to movement through narrow aisles, closely spaced work stations, and transfer operations of material involving thousands of items in the small and medium size range. The dimensions of this table-truck are: 5' high, 2' wide. The top shelf is approximately $3\frac{1}{2}$ feet above floor level, and the lower shelf 18 inches.

The metal bins in the room, attached to the walls on two sides, are numbered according to section or department in the store. All not-so-large packages are placed in these bins from the flat trucks (after entering) as they arrive from the

receiving platform. To avoid heavy lifting, the larger or heavier packages in this group are placed in the lower bins, the lighter ones



4. Machine in center, ticketing operator works from left to right. Order is then reversed.

5. Stockmen shelf goods from castered table. Note slotted uprights for adjusting shelf space.

6. Checker lifts the unpacked garments by hanger from box to castered rack to prevent soiling.

in the second row on top. Large packages are placed on platforms in front of the bins, while big cases are temporarily stored in the middle of the floor. This systematic method of disposing of the material (according to size and weight) avoids difficult lifting tasks and keeps practically all of the handling of the units a one-man operation.

Each bin section has its own invoice file, and the checker gets the file in the morning to check the merchandise in. The contents of the packages are loaded on the handy table trucks for movement to the adjoining marking room. In the marking room, numerous marking machine stations are located along the walls, where automatic pinning machines perform the operation on soft goods. For hard goods, hand marking is used.

Mobile Layout

The "mobile" layout at each machine marking station is a noteworthy feature. The operator sits between two table trucks, with the automatic pinning machine in front of her, as shown in one of the photos. The operator works from one truck to the other. If a loaded table has just been spotted on her left side, she will remove the items from it and place the marked and pinned merchandise on the empty table at her right. When the table at her right has been loaded, this unit will be rolled out, and then a full truck will be spotted in its place. Thus the girl will with no loss of time continue by working from right to left.

In the center of the room, where the hard goods are marked in, the table trucks are arranged in parallel rows, forming aisles between each two. Equipped with their hand marking devices, the operators work on the trucks in the order in which they are lined up. Completed loads of merchandise are removed as they are finished, and new loads rolled in place.

You can see that, by use of these castered table trucks, the merchandise is readily kept rolling. If stationary tables were used, for example, the marked-in merchandise would have to be rehandled for loading into trucks. This extra handling is eliminated, and at the same time the mobility is a dis-

tinct aid in the flow of the goods to and from the numerous marking stations. The Halle Bros. Co. uses some 250 of these trucks. And since the castered units are rubber tired, an efficient as well as a noiseless operation is obtained.

Coats, dresses and other types of garments go directly from the checking-in room to the garment room, where the bulky cartons or boxes are placed on platforms according to department. Checking tables are located at one side of the platforms. Clothes hangers are suspended from T-shaped racks above the tables for accessibility and to allow a greater working area for the checkers. In removing the garments from the boxes the merchandise does not have to be "manhandled" by the operators. The checker inserts the hanger in the garment before removing it from the carton and then hangs it up on a "running rack". The castered clothes racks are six feet high and 10 feet long, and thus have sufficient capacity for a shipment of average size. A wire mesh guard at the base of the rack prevents long garments from trailing on the floor. Note that these mobile racks, like the table trucks, avoid the use of stationary equipment which would entail walking and rehandling. The racks are positioned directly alongside of the checking operators. Usually one clerk "calls" while the second one makes the entries on the detail receiving sheets.

When a rack is completed, a card is attached which is marked with numbers indicating the following information: department number, date, the number of the checker sheet, and the number of pieces. Several smaller shipments on one rack may thus be divided by several cardboard signs. The checked racks are moved into marking position a few feet beyond this location in the same room. The loaded racks are arranged in parallel rows so that workers can work from either side. Each operator works from a small castered table which has 20 divisions for the variously colored tags denoting style, size and color of the garments. (The tags have previously been prepared on a marking machine.)

With this operation completed, the garments are wheeled to the

nearby inspection station. Approved merchandise is placed on the same type of racks for movement to the sales departments.

Shelving Related to Good Handling and Proper Space Utilization

Depending on the demand for a particular class of goods (other than garments), the merchandise may be sent from marking directly to the sales floor, or the stockroom. The latter destination is the more usual one. The marked-in material is delivered to the nearby stockroom—on the table trucks—with the proper section noted on the delivery slip—stationery, toilet goods, bedding, etc. Numbered stockroom locations are according to sections, and within each section each line is kept on its own tier of shelves. A specific space (or tier) is reserved for lines carried regularly, thus simplifying the locating and handling operations in the department.

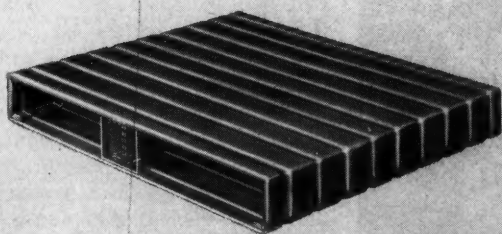
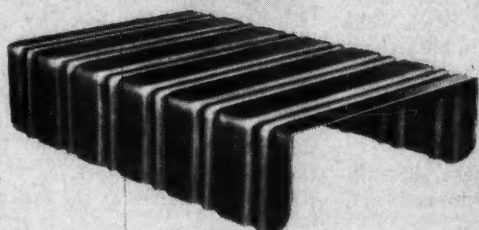
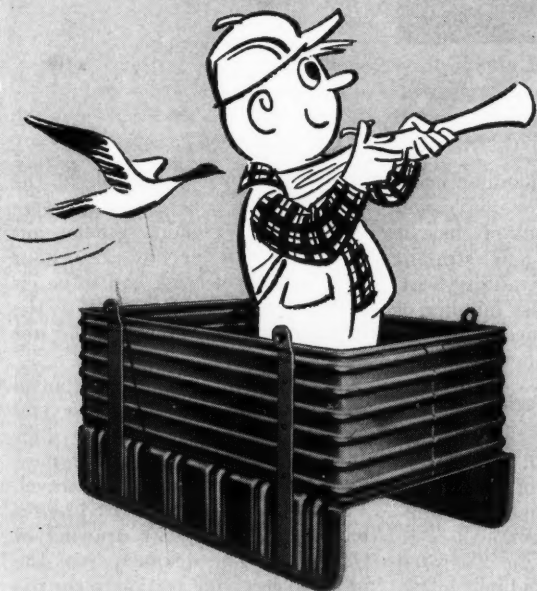
Metal shelving is used throughout, which makes for cleanliness and neatness. The individual shelves are adjustable on the up-rights which are slotted at intervals of about two inches. Thus, when low cartons arrive—a small size of a given line—the shelves in that tier can be readily lowered to conserve vertical space. They are as conveniently adjusted in the other direction when a shipment of tall cartons is received. The point is: because the adjustable shelves permit instant adaption to height of the cartons, efficient use of vertical space is made at all times.

The value of the castered table trucks is also evident in the stockroom. They are easily maneuverable in the four-foot wide aisles. In picking or replenishing stock, the operators can work on either side of the "rolling table" within the aisle. And the lower and upper decks provide convenient working levels for loading or unloading merchandise.

Sales department requisitions for material in stock are required and are delivered by air tube. The orders are handled and filled on a six-hour basis, except in cases of emergency. Arrival time is stamped on the face of the slip, and after the stockman has filled the order

(Turn to page 50)

HUNTING BIG PRODUCTION GAIN?



UNION METAL'S *Engineered*

Materials Handling Equipment Will Help You

NEW high speed production quotas require modern methods. Union Metal's materials handling equipment—tough steel skids, boxes and pallets—help meet these requirements because they

★ SPEED PRODUCTION

★ CUT COSTS

★ SAVE TIME

Union Metal equipment is engineered to do the job with maximum efficiency—helps you move raw materials or finished products in unit loads, safely, quickly, economically.

Stock items to meet standard requirements—special designs for your special needs. For complete information and able engineering assistance, wire, call or write The Union Metal Manufacturing Company, Canton 5, Ohio.



UNION METAL

Materials Handling Equipment



Fork truck trailer train moving miscellaneous materials to the assembly line. Note pallet load on truck in left foreground.

What's New....

WHEN Kaiser-Frazer and Graham-Paige took over the Willow Run Plant just one year ago, the place was jammed with machine tools and other equipment for the manufacture of B-24 bombers, and the general confusion accompanying the end of a huge war project. The wide bays with long crane spans, ideal for overhead movement of 90-foot wing-spread bombers, are seldom used in the automotive industry. The typical conveyors, monorail and drag chain, synonymous with General Motors, Ford, and the rest were missing. The shipping and receiving areas were a flat straightaway, excellent for airplanes but inadequate for handling automobiles and/or their parts. The staggering size of the plant (about 3000 feet by 700 feet) in itself presented many problems from an efficient layout standpoint. At the same time, however, the huge size of the

single floor main manufacturing area made it ideal for conversion to automobile production since it provided space for long straight assembly lines, inside railway loading docks and the vast number of other installations necessary for economical mass production.

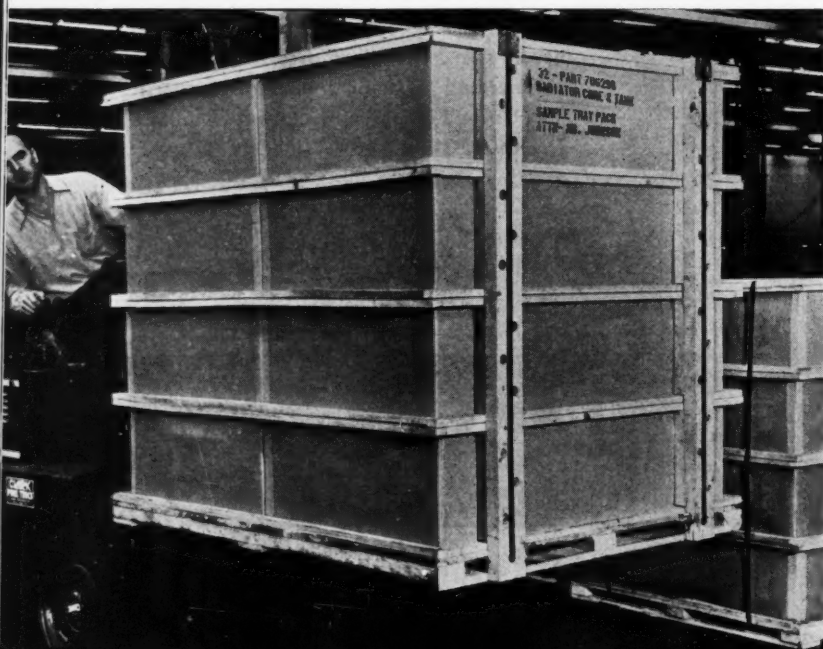
Where to Begin?

This was probably the question which loomed over all others during those first weeks of November, 1945. Logically enough the shipping and receiving sections were among the first to be analyzed from a material handling angle. As the railroad tracks were level with the floor, and no truck wells had been constructed in both these areas, some type of arrangement had to be provided in order to bring the floor level with the railroad cars and trucks.

At the receiving docks the railroad tracks were depressed and

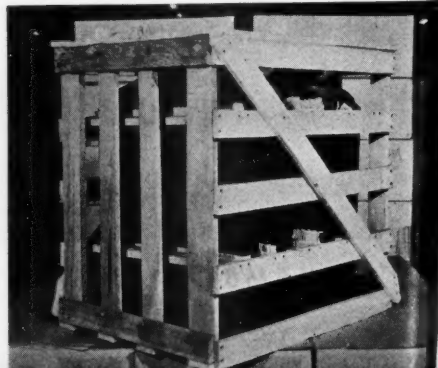
truck wells provided, while at the shipping area concrete ramps were constructed for loading the new automobiles into the box cars. Four new sections of track had to be installed also at this location, as the bombers were flown away and not shipped by rail.

The problem of material control was a major one due to several factors. One of the obvious difficulties was the distance for messages and paper work to travel. This can be best appreciated by referring to the layout drawing of the plant. The distance from the physical receiving section to the paper-work department for that section is about 400 feet, so some method other than walking to and from these areas had to be devised. A vacuum tube system was the solution, and now seconds rather than minutes are consumed from the time the paper work leaves one station and arrives at the other.



New method of receiving radiator cores and tanks by tray pack, left, thirty-two to a load. The pallet has a one-inch retaining strip, while the entire mass is held by strapping.

Old method of packing radiator cores, four to crate, below. Suitable protection from the elements was lacking. Longer time to crate parts was unavoidable in this type of packing.



AT WILLOW RUN?

Modern automotive material handling, effective use of vast unobstructed floor areas—two features in the production of America's two new cars.

Some question might arise here as to the selection of stations so far removed from each other. This may be answered by noting the location of the bays which extend out beyond the manufacturing area. In a normal straight line flow layout, the productive areas are usually held in as continuous a path as possible, while the so-called non-productive areas are positioned at points adjacent to the regular movement in the main line. Hence the selection of the two larger bays for receiving, which provides for receiving of material closer to the point of use.

Trailer Train & Intercom Units

To feed the smaller parts into production upon receipt, over hauls of several thousand feet to and from the point of delivery, a trailer-train method is used, as shown in one of the photos. The train pulls alongside the boxcars being unloaded, loads up, and moves to the assembly line.

A fork truck is used to load the trailers at the boxcar (palletization of parts will be explained later), as well as unloading the shop trucks at the point of use in the main assembly line. Departmental fork trucks are employed at assembly points in the line, which eliminates delays while unloading the train as it proceeds from station to station.

Another problem which arises daily in most plants is the matter of miscellaneous truck intraplant handling. Maintenance work falls into this category, and many times it is necessary to have very prompt service. To handle these and other intraplant deliveries, an intercommunication system is being installed which will connect the dispatching office with the central material handling office. In this way walking will be eliminated and quick service assured.

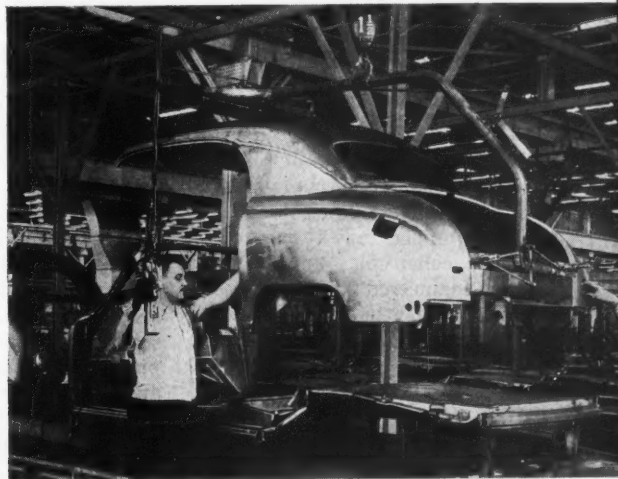
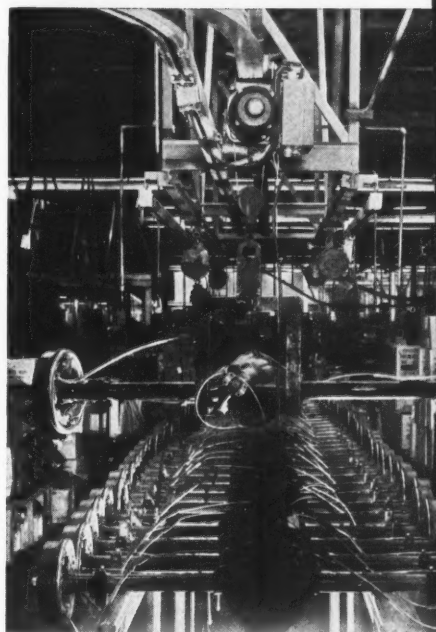
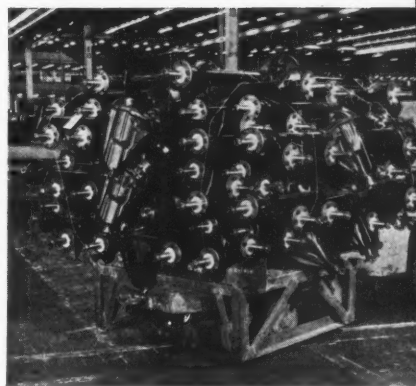
It should be mentioned that the arrival of urgently required parts from outside suppliers is announced by the receiving department on the mezzanine floor by automatic transcriber to the Planning Dept., and by five stock depots throughout the plant. This method produces an immediate written record which is typed into the stock records later. Here again walking is eliminated, and stock records can be maintained to within a few minutes after the material arrives.

The grouping of receiving, shipping, and stock storage department heads in one section on this mezzanine floor under the superintendent of material handling, unifies both material control and distribution. In a plant of this size (as well as smaller plants) needless phone calls and written instructions can be eliminated by placing individuals with allied interests and responsibilities in one section where they can discuss their problems first hand.

Rear axles strapped to angle-iron rack being moved to assembly, top. Note how differentials are spaced to provide maximum grouping.

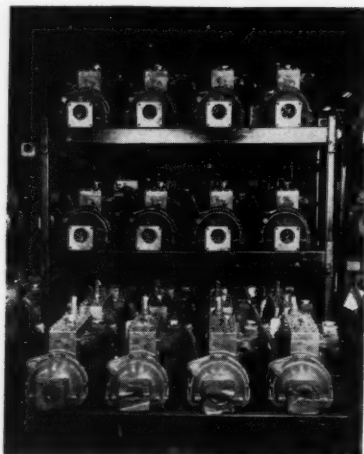
Axles assembled to brake unit resting on tubular rack, right. Hoist removes axle to main auto assembly line to be joined to chassis.

Balloon fixture handling, with hoist lowering top and quarter panels to floor for welding. Note special four-wheel dolly on conveyor.



Many Conveyors Used

It should be mentioned that most of the parts which make up the Kaiser Special and the Frazer cars are purchased from other manufacturers who specialize in that particular field. The assembly of these parts into finished automobiles is the home plant's responsibility; therefore, the conveyors had



Motors resting on steel racks before being assembled. Rack in foreground shows supports.

to be arranged to circle the unloading docks, move to some location near the point of use in the assembly line, and return for more parts.

An example of one of the receiving points is the frame line shown in the layout drawing at (C). The frames arrive in open top cars which permits overhead handling to storage outside the plant. A mobile tire-mounted crane is used here to unload the cars and position the parts in the storage zone, or transfer them to the monorail system. On the monorail the frames move into the plant to another storage area from where they are placed in the carrying fixtures mounted on the assembly conveyor.

"Surface Plate" Body Trucks:

The sheet metal parts of the bodies, other than those manufactured at the plant, arrive either in specially equipped railway cars or on special collapsible and tierable racks engineered to protect the parts in order to eliminate excessive sheet metal finishing. Since the bodies are of welded construction, accurate positioning and location of parts during welding must be held. To facilitate holding the parts during assembly, a plate

of steel mounted to channel iron supports on four wheels carries the body through the various welding operations. Since this plate is rigidly constructed it acts as a portable surface plate furnishing a true base for alignment of parts.

The welding of the component body parts is facilitated and held to accurate dimensions by a "balloon" welding fixture. This device is positioned by an overhead hoist, as shown in one of the photos, to the surface plate body truck. The parts to be welded are positioned and the fixture holds them until they are secured. The hoist then lifts the fixture and the body moves on to the next station.

The wheels of the four-inch channel iron oversize dolly rest between the links of conveyor chain which are set slightly below the level of the floor. This method of transporting the trucks is used because of the ease with which they can be removed from the main flow for any repairs or adjustments to the body.

With the conveyor chain embedded in the floor, the addition or removal of body trucks is possible without interfering with the movement of the other bodies on their way to storage. This type of conveyor feeds five other body lines, and the use of many body truckers for transfer to storage lines is avoided.

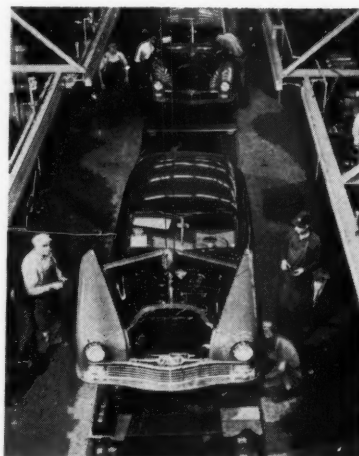
Inclined Chain Booster: After the body has passed through the painting and baking operations and through the trim line, it is carried to the mezzanine floor by an inclined chain conveyor. The chain is provided with safety dogs that prevent the bodies from slipping backward should a link break. This procedure is used because it is more practical to lower the body to the chassis in the assembly line than positioning it from a storage point on the main floor.

A hoist with padded grapples (to protect the painted body) is used for this purpose. Storage space is provided for the bodies as they arrive from the first floor until they are ready to be returned and assembled to the chassis. A 5-bank pusher conveyor extends into this area moving the bodies from the inclined chain booster to storage, and from storage to the rectangular opening in the floor where they

are lowered by the hoist to the chassis.

Racks and Pallets

The engines for the automobiles are received at dock (D), lifted by overhead crane, and moved to the storage area by monorail conveyor. Storage racks are provided which hold four motors each, and are



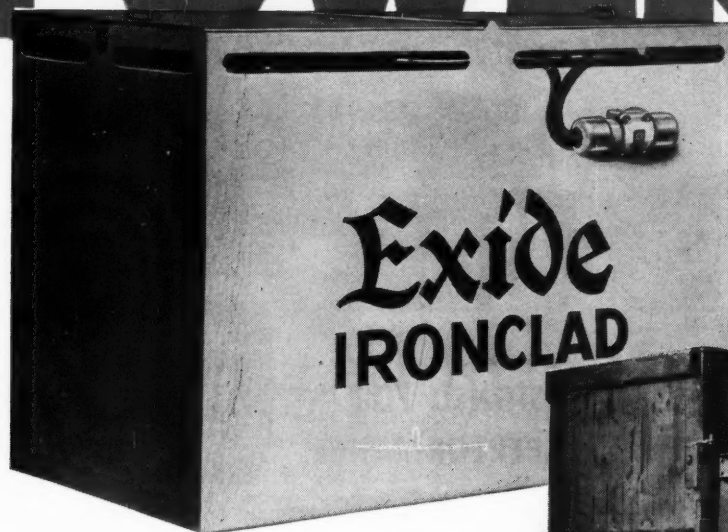
Front assembly being lowered into position from mezzanine to main body on first floor.

tiered three high. The racks are constructed of two inch tubing.

The upright collapsible ends hold the racks apart so that when the units are assembled, from the bottom up, they can be placed one on top of the other with the upright ends acting as separators. An overhead crane is used to place the motors on the racks, and also to remove them to a monorail supply conveyor when needed in the assembly line. These racks are also moved by use of the fork lift truck.

The radiator cores were formerly received in crates, which meant handling them individually. In accordance with the company's request, the radiator supplier now ships them in a newly designed tray pack. As shown in one photo, this consists of corrugated paper and wood strips to form layers and sides. Each pack contains 32 radiator cores. Eight cores are packed to a layer, each two being separated by a center partition forming a cross. The edges are strengthened with wooden strips and the entire unit is strapped to a pallet base, arriving tiered two high in carloads. Cores are one of several items brought to the line in tray packs by trailer train. Thousands of 48"x48" double faced pallets are

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NOVEMBER, 1946

used for handling packaged material, and collapsible boxes are used for forgings, stampings, etc. The rear axle assemblies are also received on pallets secured with steel strapping.

The assembly of the brake drums and controls to the axle assembly is handled in a rather novel way. Two pieces of 2½-inch pipe approximately 20 feet long mounted on legs are used as a means of conveying the axles during sub-assembly. The pipe forms a rolling surface, as shown in one photo, while the hoist mounted overhead to a monorail feeds the axles directly to the chassis assembly point in the line.

Wheel Chute

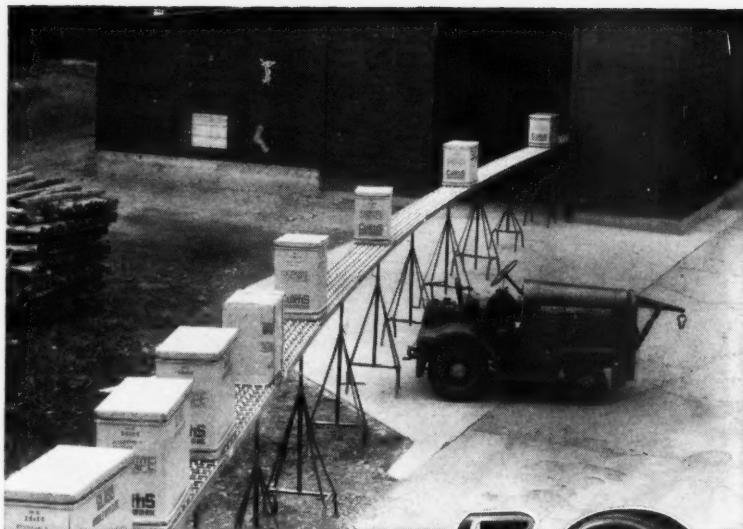
As the chassis moves on following assembly of the axles, the wheels and tires are added. The tires are stored on the mezzanine floor along with the wheels and are sub-assembled there. The tires are filled with air by a system which is continuous with the movement of the line. The hoses are attached to the conveyor and carry the air into the tires as they move along.

To send the wheels to the first floor, a vertical wheel chute is used. Made of wood with snubbers on each side, it permits the wheels to move downward under controlled speed within its walls, the space being slightly larger than the wheels themselves. They emerge at points adjacent to the main assembly line, spaced on either side at the locations they will assume in the finished car. Thus extra handling and long moves are avoided.

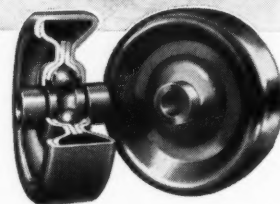
A double drag chain conveyor with fixtures mounted to it supports the chassis at working height from the floor. When the wheels are assembled, the chassis is fed to a ramp which allows it to glide down to the floor on two narrow steel slat conveyors spaced to the car's wheel width. From here until the car is completed it moves on this conveyor.

The upholstering, dash fixtures, door trim, etc., are produced at the Willow Run plant. The cutting and sewing of fabrics are arranged as a line operation on one of the mezzanine floors. Here, roll stock is cut to size and sewn into front and back seat patterns as it feeds through long banks of sewing ma-

(Turn to page 50)



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Tests prove that the Rapids-Standard No. 11 recessed-hub conveyor wheels that are grease-packed on assembly are less vulnerable to corrosion, are longer-lived . . . give more efficient service. These tests compared the special Rapids-Standard grease-packed wheels with ordinary wheels that had no lubrication.

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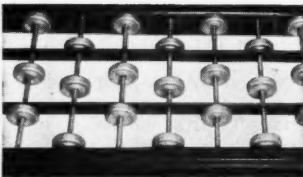
Further life-tests with over-load on the wheels show the grease-packed wheel has 2½ times longer operating life.

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12-RS-10	12"	10	550	7.5
12-RS-8	12"	8	500	7.1
12-RS-6	12"	6	450	6.7
18-RS-18	18"	18	750	9.8
18-RS-16	18"	16	700	9.4
18-RS-14	18"	14	650	9.0
18-RS-12	18"	12	600	8.6

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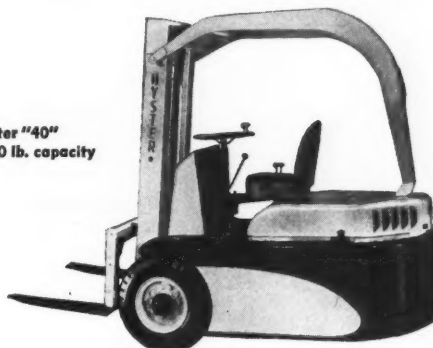
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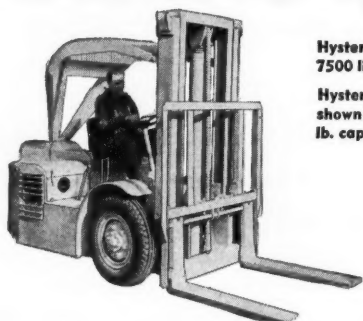
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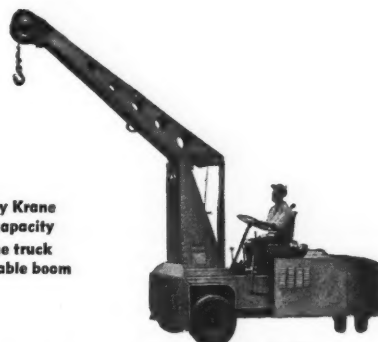
Hyster "20"
2000 lb. capacity



Hyster "40"
4000 lb. capacity



Hyster "75"
7500 lb. capacity
Hyster "150" (not shown) has 15,000 lb. capacity



Hyster Karry Crane
10,000 lb. capacity
Mobile crane truck with adjustable boom



Hyster Straddle Truck "M"
12,000 lb. capacity
Model "MH" (not shown) has 30,000 lb. capacity

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Steel guy derrick lifting sand stone block from quarry for movement to one of saw mills.

These Stones Gather

SANDSTONE appears more frequently in our daily lives than many realize. For example, it is used for the exteriors of many buildings, public and private; the flagging or sidewalks under our feet; the linings of cupolas, soaking pits, and similar facilities of the steel industry, as well as the farmer's whet and grinding stones. As curbing it lines city streets for miles, and certain grades of it are used for tombstones. You can see that sandstone is pretty much in evidence. All this is introductory to the questions: What handling practices prevail in this industry? How is this material handled from quarrying through sawing and fabricating operations, and at the same time protected against breakage?

To find the answer, FLOW visited Amherst, Ohio, known as the sandstone center of the world. Here the greatest producer of the stone,

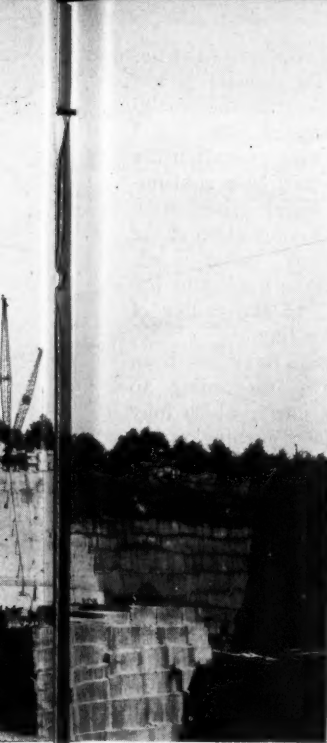
Over the span of a century, material handling operations at the Cleveland Quarries Company have kept pace with progressive mechanization in the fabricating divisions.

the Cleveland Quarries Company, is working the largest deposits known. The company's property comprises some 800 acres. From the five quarries worked at present: approximately 2,000,000 cubic feet of rough blocks are produced annually, the larger part of which is fabricated into the items mentioned for the building, steel and hardware industries. A point of special interest is the fact that one of the company's five quarries is the world's deepest (228 feet) and another the largest, measuring two miles around.

Located on the grounds are two stone saw mills (with 25 gang saws), a fabricating plant for cut building stone, a grind stone plant,

Vertical lift by crane moves car horizontally. Note two cables, front and back, and the sheave.





Guy Derricks, Open-end Boxes

At each channeling (cutting) site is installed a guy derrick which lifts the rough blocks from the quarry. The stripping for each derrick is about 120 feet long by 50 feet wide. Many of the derricks are of steel construction and have capacities of 70 tons each. Hoist houses, operated by 25 H.P. electric motors, are located close to each unit which uses from 700 to 900 feet of $\frac{7}{8}$ -inch cable.

After channeling, the larger blocks may be broken up to mill sizes by shooting. Preparatory for lifting by derrick, hook holes are drilled on the outside surfaces of the blocks. This permits easy removal of those located adjacent to the uncut ledge by use of chain slings with hooks attached through ring bolts.

Flatcars are spotted on tracks running parallel to the face of the ledge on either side of the quarry. Thus the blocks can be loaded directly by derrick from the quarry

It is interesting to note that this rugged outdoor operation is performed with the same regard to good housekeeping as it would be within a spic-and-span plant. The ledge, working area for the channeling or cutting crews, must be kept clean at all times. Scrap developed during channeling and drilling is therefore regularly removed. For this purpose four-sided, open-end boxes are employed which have a clevis attached to each corner for derrick handling. By use of a four-way chain sling the full boxes are lifted to a railroad side dump car. After the box has been deposited, the two front hooks are detached and the derrick then lifts the sizable container by the back clevises, thus discharging

her No Moss

and, among other facilities, three fire stone departments.

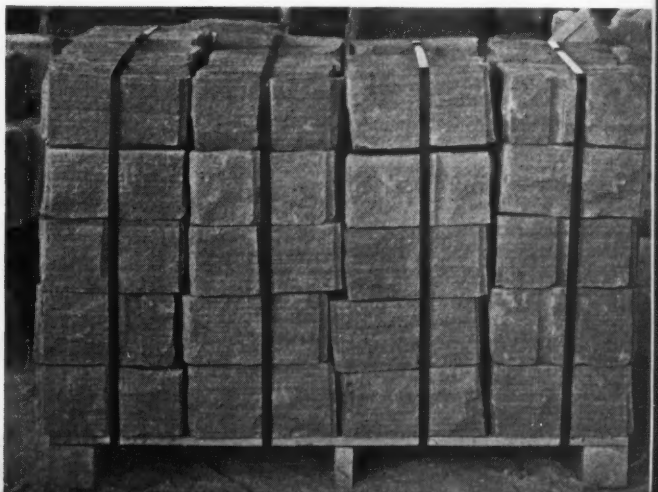
Twelve miles of railroad track connect the quarries with the various processing plants; two company-owned freight locomotives hauling standard flat cars are the prime movers of the blocks between quarries and plants.

for movement to the processing locations. Or the derricks may build temporary storage piles adjacent to the track. When the material is not destined for immediate processing, the loaded flatcars may be hauled to a convenient storage location where locomotive cranes will build the stockpiles.



Slab, previously sawed on flanged-wheel car, is placed by hoist on rollers feeding brake, above.

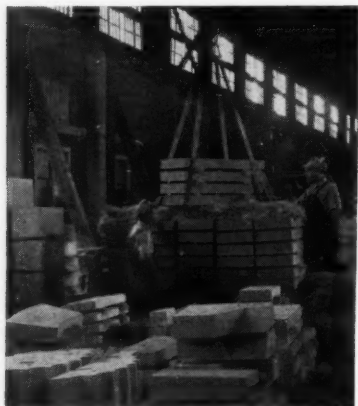
Company has begun to ship strapped pallet loads of fire stones, below. Program to be extended.



the scrap stone through the open end. These rubbish containers, about seven feet long, four feet wide and three feet high, are also used in the plants.

Crane Handling Within Plants

Let us now observe a typical handling operation within one of



Smooth surfaces of building stones preserved by belt slings. Note excelsior dunnage.

the saw mills. The bulky and heavy masses handled do not lend themselves to routing through an intricate layout; hence the flow is usually straight-line. The rough blocks enter at one end of a building, and the fabricated material leaves at the opposite end.

Saw Mill No. 8 will serve as a typical example. The building consists of two bays, each approximately 250 feet long and 50 feet wide. The south bay, covered by two cranes of 15-ton capacity each, is devoted principally to unloading, loading, temporary storage and handling operations in connection with service to the gang saws. The north bay houses the gang saws and their drives. The railroad spur runs the length of the south bay, adjacent to the wall.

After the cars have been spotted in the building by one of the locomotives (an auxiliary gasoline locomotive is also used), the rough blocks are lifted either by use of cable slings or hooks and placed on flanged-wheel trucks operating on tracks that run at right angles to the bay. These trucks, one for each gang saw, move the stone under the saws and, upon completion

of the operation, return it under the spans of the traveling bridge cranes.

The trucks are about 13 feet long and eight feet wide, and the individual units may carry loads ranging between 20 and 30 tons. Some of the larger size blocks, weighing 10 tons each, may be 10 feet long, four feet wide and five feet high. The blocks are placed side by side on the transfer trucks in order to utilize the full capacity of the saws. The length of the move to the gang saws is about 25 feet, and here is how the transfer of the heavy loads is accomplished—by crane.

Each flanged-wheel truck has hooked to its front end a wire rope cable which is threaded through a sheave that is attached to the floor about 25 feet in front of the gang saw location. The end of this cable is hooked to the crane and when the latter makes the lift, the truck is moved in the forward position away from the gang saws. A similar arrangement is used for moving the trucks in the opposite direction. In that case a second cable is used which is attached to the rear end of the truck. This cable is first threaded through a sheave to the back of the truck, brought forward under it and then also passed through the sheave in the forward location. A lift by the crane on the "back" cable moves the trucks quite as readily in this direction. Thus, by use of the two sheaves, a vertical lift by the crane is transformed into a horizontal

movement. This eliminates the necessity of having special power equipment for operating the heavy-duty transfer cars.

During the sawing operation the blocks are subjected to a continuous shower of water mixed with silica sand. Upon completion of the sawing, the "front" cable is attached to the crane hook and the car is advanced to the center of the bay for unloading.

The rough blocks have now been sawed into slabs (according to various specifications), which may be fabricated into curbing, grind wheels, cut stones for buildings, fire stones, or other items. The lifts of slabs are removed from the transfer trucks and placed by crane on the flat cars for movement to the specific plant where the fabrication is to be performed. (Regularly conducted analyses made of the blocks determine their uses for specific purposes.)

With certain exceptions (depending on the size and nature of the product), the flow and handling in the other buildings is similar to the one just described. After the material has been brought in by flat car it is handled by crane through fabrication, and the finished material, packed on cars, leaves at the opposite end. Crane handling, it might be mentioned, affords safe and economical handling for heavy cut building stones in process. Costly pilasters, measuring up to 10 feet long, for example, are positioned accurately by crane on planer tables. Glass-

This is 1,700-foot-long tramrail with three cranes. Lift of slabs going to brake, right.



Plan to attend the National Material Handling Exposition—
See pages 14 and 15

smooth surfaces of other stones, or those with artistic carving, are adequately protected in such overhead handling by use of belt slings.

Fire Stone Handling

In the opening paragraphs it was mentioned that three departments produce fire stone, which is used as liner for pugh ladles, Bessemer converters and similar purposes in the steel industry. One of these departments is located at the east (front) end of saw mill No. 8. The lifts of slabs designated for this purpose are brought forward by crane which deposits them adjacent to the power press or brake. Here, as elsewhere, mechanical devices perform all positioning of lifting tasks. Since it would be uneconomical to have the 15-ton crane lift the individual and relatively light slabs, a one-ton electrically operated jib hoist is installed at the brake. It places the slabs on a feeder gravity roller table. From this brake the cut strips then pass over another gravity roller section, at the end of which the stone is fed through a smaller brake, which cuts the strips to the desired size. At this point the material is about 12 feet from the railroad spur on which the freight car has been spotted. This distance is bridged by another gravity roller conveyor at which the inspector is stationed. From here the approved pieces pass over the roller line into the out-bound car. By use of portable sections the conveyor is extended into the ends of the car being loaded, thus eliminating unnecessary lifting and walking on the part of the loading gangs.

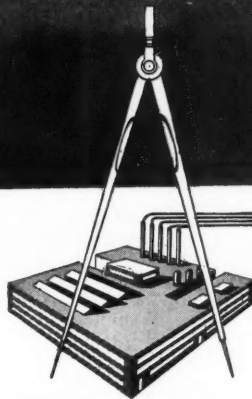
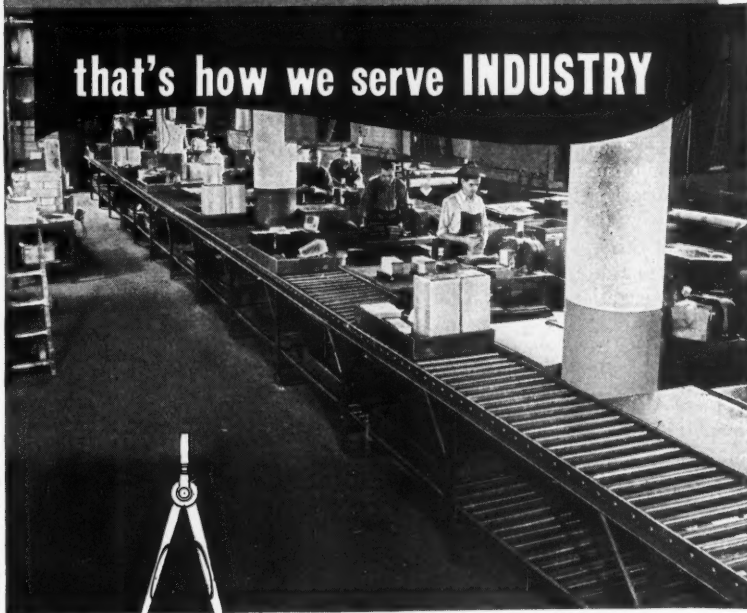
Random pieces of scrap stone are regularly disposed of into the open-end dump boxes described previously. These containers are positioned at inspection stations. Since the units have considerable capacity, they are convenient both for scrap removal as well as temporary storage purposes.

Pallet Handling: L. C. L. shipments of fire stone for several accounts are shipped in strapped pallet loads (see photos). The hardwood pallets (37x48 inches) are spotted at the end of the conveyor line in the car, and thus it is not necessary to move the palletized units upon completion. A load may consist of 120 pieces, stacked in

(Turn to page 46)

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Logan double deck roller conveyor delivers made-up orders to packers, and returns empty tote boxes to stock room for refill. Other Logan Rolls move packed cartons to shipment.

"Service with a smile" is a good old American sign — seen on every street — a familiar part of the native landscape.

It is not an empty slogan. Back of it, guaranteeing fulfillment, are the engineering accomplishments of American industry, of which Logan Conveyors are such an integral part.

Engineering is Logan's business. It's what we have to sell, the priceless factor which we build into our equipment, to save time, effort, space, and to get the job done easier at the same time.

Yes, it's all a part of American industrial genius that makes possible the sign, familiar to us all, "Service with a smile."

Logan Conveyors

LOGAN CO., INC., 558 GABEL ST., LOUISVILLE 6, KENTUCKY



ON THE



PALLET

NEWS · VIEWS · TRENDS

IN comparison with the standards of today, production operations considered efficient in 1941 are far behind the times now. This was the gist of an interview, reported in the *Detroit Times*, given by Albert M. Sargent, industrialist, inventor and president of the 18,000 members composing the American Society of Tool Engineers. Increased production, he said, cannot be obtained by putting the pressure on operators, whose frame of mind has undergone a change. The only way out, according to the well-known engineer, is the increased application of mechanization. This is also the main principle underlying modern handling practices. Every FLOW article shows you a different application of this principle—another way of reducing the over-all production cost.

UNSCRAMBLING the maze of rules and regulations governing the purchase of surplus war materials, a booklet titled "How to Obtain Surplus" has been published recently by the *New York Journal of Commerce*. It covers the purchase of all types of products and materials, from office equipment to chemicals, automotive parts and building materials. The publication explains how to obtain priorities and gives the location of all sales offices handling surplus. A section is devoted to the veteran and his priority regulations. Copies cost 25 cents each and may be obtained from the Journal, 63 Park Row, New York 15, N. Y.

THE Chain Belt Company, Milwaukee, announces that it has materially increased its plant capacity through the purchase of the heavy ordnance plant located in West Milwaukee. The acquisition of the one-story structure adds approximately 317,000 square feet to the company's existing facilities. Present plans call for its use in the manufacture of chain belts and some construction machinery.

POLAROID three-dimension presentations feature the Steel Strapping Exhibit presented to the Museum of Science and Industry, Chicago, by Acme Steel Co., in September. You step up to four-foot-high vertical polarized filter windows, press a button and in three minutes you see 15 three-dimensional scenes of steel-strapping applications taken from actual field installations. Six visitors can watch the show at one time, and the pictures can be started by buttons at any of six windows.

Center piece of the exhibit is a cut-away model of a freight car which shows visitors what happens inside it when the shocks of switching are absorbed by the floating unit-load method of bracing shipments. The

load at one end is braced by the conventional method while the other is steel-strapped. The car rests on a piece of track which is automatically tilted at one-minute intervals. A miniature figure seated on the fixed load gets noticeable jolts whereas his "buddy", atop the unit-load end, hardly shows a quiver.

A WIREBOUND crate, believed to be the largest ever designed, is now being used by the U. S. Machine Corp., Lebanon, Ind., for the shipment of 2,200-pound commercial self-feed stokers. The specially designed crate measures 114 inches in length, 60 inches in width and 36 inches in height. Component parts of the stoker are fastened to an 111-pound box skid and a 67-pound wirebound mat is wrapped around it to form a single unit package. Tare weight of the container, including a 40-pound wooden top, is 218 pounds. A check on a recent shipment of 42 stokers showed that the units arrived completely intact.

WARTIME miracles of production clearly show that America has ample physical assets to both build and maintain high levels of peacetime prosperity, says Stuart Chase in a new report, *For This We Fought*, soon to be issued by the Twentieth Century Fund. The task won't be easy, says the writer, who lists some of the following peacetime objectives: keeping the business cycle in line, providing full employment, spreading social security to all who need it, administering the debt, easing atomic energy into industry. But, he points out, they are kindergarten work in comparison with the physical achievements of making 297,000 airplanes from scratch, and helping beat Germany with one hand while overwhelming Japan with the other. "The story clearly indicates that we in America can have anything we want in a material way, provided we want it badly enough to organize and discipline ourselves."—Beef, too?

ONE of the first mass shipments of tires by air freight service was recently accomplished between Dayton and San Antonio, Texas. The Dayton Rubber Company loaded the 8,000-pound shipment at three p.m., and six hours later the 500 passenger car tires arrived in the C-46 cargo air liner at the Texas destination. The truck loads were backed up to the giant doors of the plane and the tires were stacked 15 high in the cargo area. A canvas lacing was lashed over the tires and secured to the floor for protection during the flight. We have to get used to the idea that many of the "things to come" have already become a reality now.

"BOUND TO GET THERE"

... *Freight Claims Eliminated*



Photo of an actual shipment using Acme Unit-Load Principle.

by ACME *Unit-Load Method*

Damaged goods and profit-draining freight claims are a rarity when carload shipments travel the Acme Unit-Load way.

For Acme Unit-Load secures, protects, and braces cargoes in the grip of strong steel bands . . . assuring safe delivery at every point along the shipping line.

And, customers merely snip the bands to unload a damage-free car with a minimum of time and effort.

So, use Acme Unit-Load Band and methods for bracing, stowing your carload shipments. Then watch freight claims vanish, customer good will increase. Investigate now.

Doc. Steeltrap REG. U.S. PAT. OFF.

HOW A CONTAINER MANUFACTURER CUT FREIGHT CLAIMS

This actual case history offers proof. In shipping over 6,000 carloads of 55-gallon steel drums and pails by the Acme Unit-Load Method, damage claims dropped to a mere 3.7% a year. In addition, 80 board feet less lumber was used in each car representing a cash saving of \$6.00 per car!

NEW YORK 7

ATLANTA

CHICAGO 8

LOS ANGELES 11

ACME STEEL COMPANY

ACME STEEL CO.
CHICAGO

NOVEMBER, 1946

37

RUGGED, YET GENTLE . . .
(Continued from page 18)

base of the "U" and connects the two parallel bays. After the individual sheets have been welded together to the dimensions needed for a tank, the large welded sheet must be picked up and fed through a rolling machine, which pre-forms the flat surface into the rounded shape required. Such handling calls for skill and care of a high order. Damage to the expensive stainless steel must be avoided, or hours of labor may be necessary to remove the defect. Even a tiny scratch on the inside surface of the inner shell is not passed by the inspector, for the minute fissure may retain milk that may eventually sour. Hence a uniform, mirror-smooth inside surface is an absolute must.

The overhead handling devices perform this and other exacting tasks with noticeable ease. The flat welded sheet may be up to 24 feet long and 14 feet wide. The crane picks it up and positions it

at the feed end of the rolling machine, where a jib hoist is installed. The hoist sling is then attached to the material at this end, and the crane moves over to the discharge end. As the formed sheet emerges between the rollers the crane's V-hooks are attached to the stainless-steel, thus preventing the curved metal from bending out of shape and preserving its tubular form.

Upon the completion of the operation, the crane moves the formed sheet to the next welding operation, where the two remaining unjoined lengths of the tank-to-be are welded together. The long cylinder is then ready to receive the ends, or heads. By use of a chain sling the crane now transports the assembly to this station, where the unit is placed in a vertical position. After the top head has been assembled to the shell, the crane lifts it vertically by means of a S-shaped hook so that the bottom head can be slid under and welded into place, thus forming the closed stainless steel shell.

The crane then places the shell horizontally on the nearby positioning rollers, where the unit is

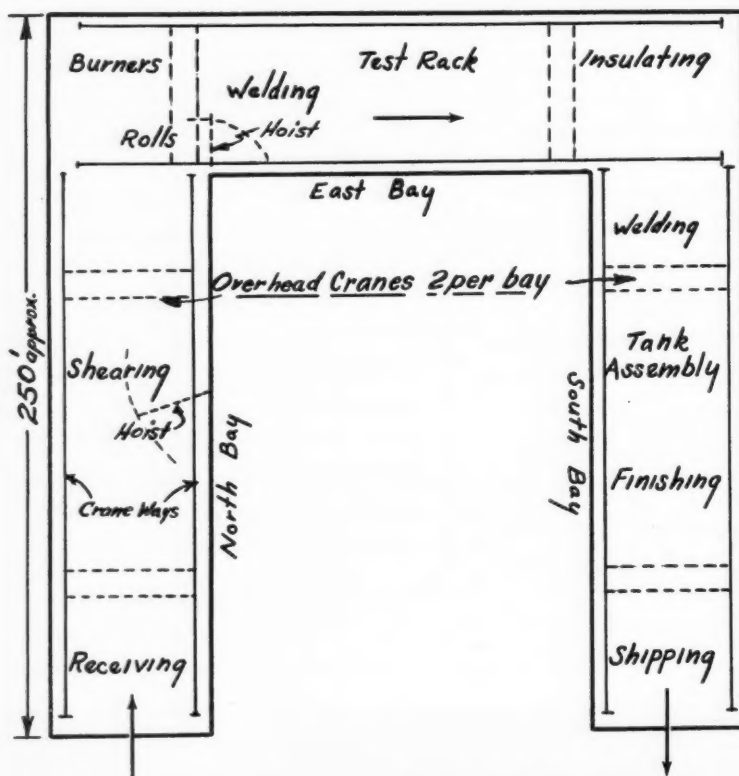
revolved during the subsequent cleaning and blending operation. Here the protective covering is removed from the stainless steel and the interior of the tank polished ("blended") to a uniform smoothness. Prior to the operation, two "hoops" of channel iron are put on the tank, one at each end. The channels serve as reinforcements, also as the "tracks" for the rotating powered wheels of the roller which turn the unit during cleaning.

After cleaning and blending of the inside surface, the tank is transferred to the testing department and positioned on a framework of beams. The approved tank is then ready for the final assembly and finishing operations which take place in the third bay that parallels the one in which the raw material was received.

The transfer between the two bays is accomplished by use of a truck, which is about 10 feet long and four feet wide. The shell is now ready to receive its insulation coating of cork and, upon completion of this operation, the outside steel jacket. Here other precise handling operations must be performed.

A good example is the method used for turning the sizable assembly during the application of the cork. At intervals, the tank must be turned in order to make areas accessible that are out of the operator's reach. This trick is performed by the crane using a 2½-inch endless rope sling. The sling is applied slightly off center, and when the crane lifts the tank it rolls over to compensate for the off-center position. In this way the bulky and heavy unit is readily positioned according to need.

The completely covered tank is then advanced to the finishing department, where such accessories are installed as doors, man-hole covers, legs, ladders, motors, etc. Using a 2½-inch rope sling, the crane then transports the completed assembly through the remaining part of the aisle, and, at the end, deposits it on a transfer truck. The unit has now traveled through the "U" of the layout and, on the transfer truck, exits into the adjoining portion of the building, where spray painting and shipping are performed. A railroad spur extends through the entire length of this



Sketch of "U"-shaped layout indicates the overhead handling facilities.

bay, which is likewise covered by two traveling bridge cranes of 10-ton capacity. After painting, the tank is picked up and lifted on the mounting previously constructed on the flat car.

Training for Accurate Handling

Thus the cranes are the prime movers that perform all major handling tasks with ease and complete safety to the costly material—from receiving through processing, fabricating, assembly, testing, including special positioning tasks that require an extreme degree of skill and accuracy.

It is understandable that The Heil Co. takes special precautions in training its on-the-floor personnel working in conjunction with the numerous cranes employed about the plant. All prospective hitchers are given a four-week training period. During this time each trainee is closely watched to make sure that he is suitable for the work.

Every new apprentice is teamed with an older operator and carefully instructed in the different hitches to be made for the various lifts. He is first shown the simplest ones and, after he can make these well, he is introduced to the more difficult hitches. Among the latter, for example, would be the rope sling hitch used for turning the milk storage tank during the application of the cork insulation. The trainee's course thoroughly covers the use of chain, rope and cable slings so that he will know how to employ the correct hitch and type of sling for every lift and kind of material.

If the operator is acceptable at the end of the four-week training period, he is classified as a "B" or junior hitcher, qualifying him for the higher rate of pay in that category. If, after a time, he is approved by the foreman for his ability and safety, with no record of carelessness, he is classified as an "A" or senior hitcher, and is then qualified to make any hitch throughout the plant.

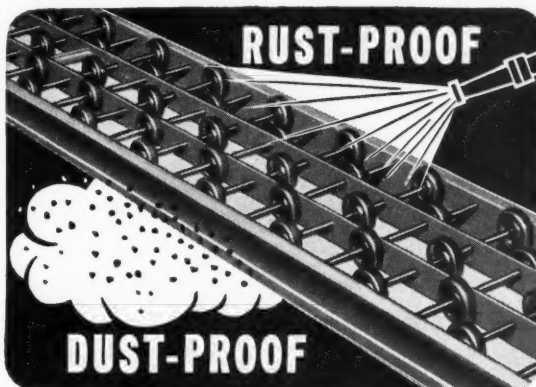
This provision helps explain why you see the huge tanks moving through The Heil Company's production line according to methods designed to combine speed and accuracy with product protection.

AUTOMATIC MATERIAL RACK

BEING marketed by the American Machine & Foundry Co. is an automatic, self-leveling material handling rack, which is activated by self-contained calibrated springs. The rack holds a visible bank of material, it is stated, and brings each piece to the operator's hand level as soon as the preceding piece has been removed. Mounted on ball bearing casters, the racks are portable, and can be used as storage units.

SAFETY DOOR SIGNAL

P. M. COMPANY offers a new blinker safety control, which it claims prevents truck-door collisions in busy warehouses, garages, terminals, and similar places. Designed to present a "live stop-light signal" to drivers whenever doors are in motion and do not allow sufficient clearance, the signals are likewise installed outside for pedestrian protection. The system operates on 110 to 120-volt AC or DC circuits.



Buschman "RED WHEEL" Portable Conveyors

are corrosion-proof, made for damp or dusty locations . . . are not affected by moisture, dust, grit or fumes. Full ball bearing is sealed against harmful elements. They are INTERCHANGEABLE with the standard Buschman Conveyors. For information on this and standard conveyors—write for Bulletin 10.

A BETTER TRUCK by BUSCHMAN

A NEW ADDITION TO OUR LINE

Made By Materials Handling And Conveyor Experts

This new Buschman hand truck combines durability with light weight. Maneuvers easily. Has steel-disc wheels with replaceable rubber treads. Rubber-tipped Handle. Rides smoothly and silently over any surface.

DOUBLE WELDED AT POINT OF GREATEST STRAIN

Side trams extend through toe plates, welded on each side (see diagram). This provides greater strength, longer service life.

Extra Large Toe Plate with beveled edges for easy sliding under loads. Sturdy Skids for easy handling over curbs.



REPRESENTATIVES IN PRINCIPAL CITIES SPECIFICATIONS

MODEL	HEIGHT	WIDTH	WHEELS	WEIGHT
6	48"	13 1/4"	6" plain, oilless-bearing	30 lbs.
8	48"	13 1/2"	8" ball bearing (see photo)	32 lbs.



THE E. W. BUSCHMAN CO., Inc.

Winton Place

Cincinnati 32, Ohio



Incoming pallets of bricks are racked to dry.
Empty pallet trays (arrow) return to press.

Getting Building M

By J. C. EHLE
Production Manager
Cleveland Builders Supply Company

As housing and business construction projects suspend operations pending delivery of vital building necessities, the cry for greater production of construction materials grows in frequency and intensity. Mechanized handling aids for bricks and blocks are playing a vital role in supplying these acutely needed products.

THE Cleveland Builders Supply Co. is today faced with the largest number of orders for bricks and blocks in the company's history. Because material handling plays a major role in efficient volume production, our firm has analyzed its existing installations and

Tractor-mounted crane lifts cubed bricks with fork from three-sided skid, preparatory to tiering them in kiln (background). Openings for brick fork can be seen in each tier. Also note spacers on skid bottom; and gripper and balance levers on back of fork.



ng Materials There *Faster*

Unit-packaged bricks are tiered by truck-mounted block fork. Note stringer blocks below cubes.



handling procedures and has within recent months initiated a modernization program designed to increase the output of our various plants. We are at present engaged in applying the finishing touches to our program, which particularly involves two plants producing brick and light-weight blocks. While Cleveland Builders is operating other plants in the Cleveland area (for tile and other types of building supplies), this description will be confined to the first two operations mentioned.

Unit Handling Replaces Single Brick Method

Our Reeves plant manufactures brick, while blocks are produced in the adjacent Hugo plant, both situated on a 50-acre plot on which our raw material pits are also located.

Modernization in both of these plants has meant elimination of manual handling of single bricks and single blocks. Today power handling is used to move "unit packages," as shown in the accompanying photos. For example, our new mechanized equipment originally made possible the handling of 850 bricks in one unit. After

closer scrutiny of the new operation, we realized that by a simple change we will be able to increase the size of the unit or cube to 1,500 bricks.

Bricks produced at our Reeves plant emerge in a green state from the soft mud press on steel pallets, six to a pallet. (The installation of a large capacity press in the near future will increase the number of green bricks per pallet; this planned change will also be discussed in a later paragraph.) The loaded pallets travel from the press on an inclined conveyor to a central switching station, from which two branch lines enter two 160-foot long drying rooms parallel to each other. The flow to either room can be controlled by use of a gate section.

Each drying room is bisected by a double-cable conveyor (see photo). The lower deck of this conveyor is used for returning the empty pallets to the press operation in the adjoining room. The full pallets are taken off the line by workers, who place them on the racks—circulating steam pipes—that line the full length of the wall on both sides of the room. It can be seen from the photo that the aisle width (five feet) is designed so that the operator can unload

the conveyor and load the drying racks without walking. At the same time the aisle width is ample for spotting the three-sided box skid by means of which the dried brick is later transported to the kilns. When completely filled, the long tunnels are closed off and steam is turned on for nine hours. Following a cooling period, skids are brought in by platform trucks for removal of the bricks.

Formerly this removal operation was accomplished with small, hod-shaped wheelbarrows that held 120 bricks stacked on either side of the wheel. With the inauguration of our new program, however, power handling enabled us to move 850 bricks at one time.

The empty skids are spotted in the aisles with the open side toward the racks, four skids on each side of the room. These specially-designed skids not only carry 850 bricks, but also serve as jigs to guide the operators in cubing them for unit handling by the brick fork. Each skid has spacer strips fitted on its deck. The first layer is placed on edge, with spaces between each row providing clearance for entry of forks. The subsequent layers are placed flat and crosswise to the first layer in an interlocking

pattern. Thus the bricks in the bottom layer actually serve as runners under the cubed load.

Loading the Kilns

Taken from the drying rooms by platform truck, the loaded skids



Platform truck moves rack of blocks into steam kiln. Note headlight for spotting loads.

are transported to the open scove kiln being loaded. Each of the seven huge kilns will hold between 750,000 and 850,000 bricks. It can be appreciated that the loading of this size kiln brick-by-brick and by means of wheelbarrows would be a costly and tedious operation.

The kiln structure consists principally of two brick walls spaced about 30 feet apart, with gas burners at the bottom of each wall spaced at three-foot centers. As the skid is delivered, the truck operator spots it under a tractor-mounted 21-foot boom crane from which the fork is suspended. The crane operator lowers the fork to the level of the load on the skid, and a helper inserts the fork between the runners previously arranged under the load. While in the other plants such forks are also handled with overhead traveling cranes, the space limitations of our existing plant indicated the advisability of a mobile crane.

The fork has nine tines, and is equipped with small grippers or dogs on both sides of its inside surfaces or edges. These grippers

are actuated by a manually operated lever on the back of the fork. After the fork has been inserted under the load, the operator throws the gripper lever. This causes the grippers to extend from the edges of the fork and hold the "stringer" bricks in place. When the cube is lifted the weight rests on the fork.

Because the balance of the fork is changed when loaded, a special control lever is located on the back to allow the ring to be recentered for the required center of gravity. This adjustment is also made before the empty fork is removed from under the load after depositing the cube.

The production value of our new method can be more readily appreciated when compared to the old method of loading the kilns. In those days eight wheelbarrows were used on each kiln. Each wheelbarrow man threw the bricks up to two "setters" stationed at varying heights along the face of the rising pile. This entailed hard manual labor as well as many manhours.

Now, the crane operator and his helper can stack the cubed brick in a fraction of the time formerly required—minus the hard labor—aided only by one setter. Of course, the savings accrue likewise, when the kilns are being unloaded—by the cube instead of brick by brick.

Building a Larger Cube

I mentioned previously that our production capacity would be increased—this because of the greater

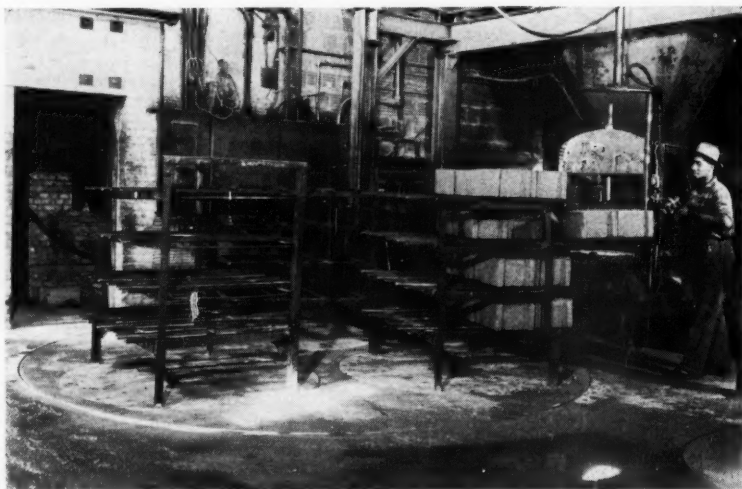
handling capacity of our new mechanized system of cube handling. A new brick press, presently to be installed, will produce in an 8-hour shift 84,000 five-pound bricks. This will replace two machines with a capacity of only 34,000 bricks each. The new machine will deliver seven bricks to the pallet instead of six. In order to handle this greater output from the drying rooms to the kilns, we are going to increase the size of the present cube from 850 bricks to 1,500 bricks. To do this, we will employ correspondingly larger skids for transporting the dried bricks. The new skids will be two feet higher than the ones in use at present. This will take advantage of the present unused capacity of the brick fork now used to load the kilns. And in this manner better balance will be obtained between production and our greater handling capacity.

As previously mentioned, the finished bricks are unloaded by fork and placed directly on outbound highway trucks. At present, space limitations do not permit us to load freight cars in the same manner, but we are planning to rearrange our layout so that we will be able to locate a railroad spur adjacent to the mobile crane.

Modern Block Handling

We found that similar problems had to be overcome in the adjacent Hugo plant, where light-weight building blocks are produced. Here, despite terrific production demands,

Air hoist loads blocks on rack, on one of hand-powered turntables within large electrical one.



See the new
"Where to Buy it Locally"

Section, page 58

It's your handy reference to local
sources and services

the new mechanized handling facilities have gradually replaced the former manual operations. Approximately 10,000,000 8"x8"x16" blocks will be produced here in 1946. The blocks produced vary in size and weight, and hence facilities for handling all of them had to be developed. The three main sizes are: 4"x8"x16", weighing 16 pounds; 8"x8"x16", weighing 30 pounds; and 8"x12"x16" weighing 45 pounds.

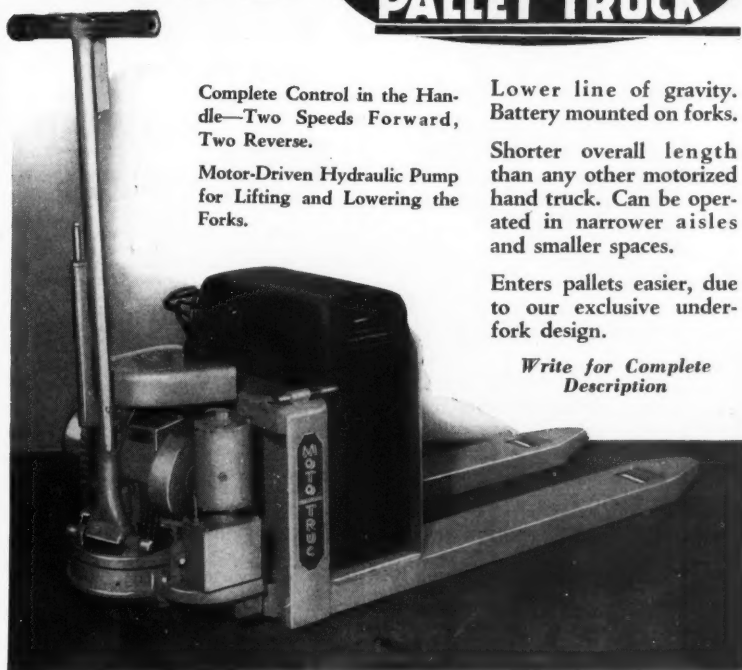
A definite aid to our stepped-up handling program is the plant's location adjacent to an elevated, natural-level roadway, where the storage hoppers are installed. Over-the-road trucks can thus deliver raw materials and dump them directly into the gravity bins, which feed the processing machines on the lower level. Materials from the various sand, cement and aggregate bins are measured into a 56-cubic-foot traveling "weigher," which is suspended on rails directly beneath the bins and above the 42-foot stationary batch mixers. The latter, when loaded by the weigher, supply batches of mixed ingredients to the four molding machines located at working level just below them. Gravity is thus used to answer our supply handling problems from incoming truck to molding machine.

Blocks formed on individual pallets emerge from the molding dies and are removed from the machine by an "off-bearer," a carrying device used to move the green blocks out about two feet, where the operator uses a spade-shaped, air-operated jib hoist to pick them up and place them on a rack standing close by. These specially-designed racks are formed of angle-iron and will hold 48 of the 12-inch blocks, 72 eight-inch or 144 of the four-inch. When needed, the racks are brought in by platform trucks and positioned on one of the turntables adjacent to the molding machine. When one side of the rack is filled, the operator can turn it around by hand on the revolving table, thus making the other side immediately accessible without having to reposition the rack by truck.

Turntables Positions Racks

In front of the No. 1 machine, which makes the large 8"x12"x16" blocks, a large, electrically-con-

New MOTO-TRUC 12-Volt PALLET TRUCK



Complete Control in the Handle—Two Speeds Forward, Two Reverse.

Motor-Driven Hydraulic Pump for Lifting and Lowering the Forks.

Lower line of gravity. Battery mounted on forks.

Shorter overall length than any other motorized hand truck. Can be operated in narrower aisles and smaller spaces.

Enters pallets easier, due to our exclusive under-fork design.

Write for Complete Description

The MOTO-TRUC Co., 1959 E. 59th St., Cleveland 3, Ohio

SAVE PRODUCTION TIME

with a

SHOPLIFTER

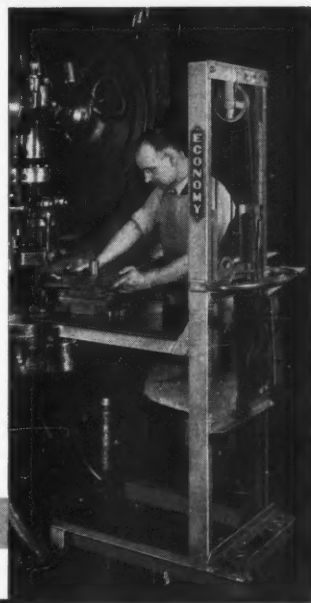
One man can handle heavy dies up to 500 pounds alone. Easily moved about. Also handy for loading and unloading trucks and miscellaneous lifting jobs. Platform 24 in. x 24 in. Lift of platform 4 ft. 6 in. Price \$157.50 (foot operated floor lock optional, \$10.00 extra). Heavier capacities available up to 5000 pounds.

**PROMPT
DELIVERY**

Full freight allowed.

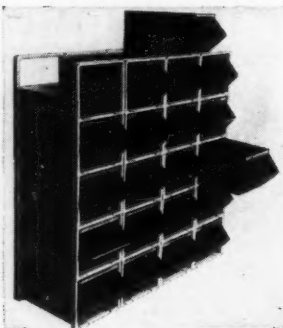
ECONOMY ENGINEERING CO.

2677 West Van Buren Street
Chicago 12, Illinois

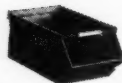


REDUCE HANDLING

of Tools, Parts and Materials



STACKBINS IN STACKRACKS



STACKBINS are individual hopper-fronted stacking bins, designed for storage, transportation and assembly of tools, parts and materials.



STACKRACKS are individual units which lock together to form racks of any size, shape or capacity. Stackbins slide like drawers in Stackracks.

Because Stackbins are portable containers—not fixtures—tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed—without disturbing any other bin.

Manufactured and sold in Canada exclusively by Walter H. Wickware, Ottawa

Write Stackbin Corp., 1091 Main St., Pawtucket, R. I.

STACKBIN

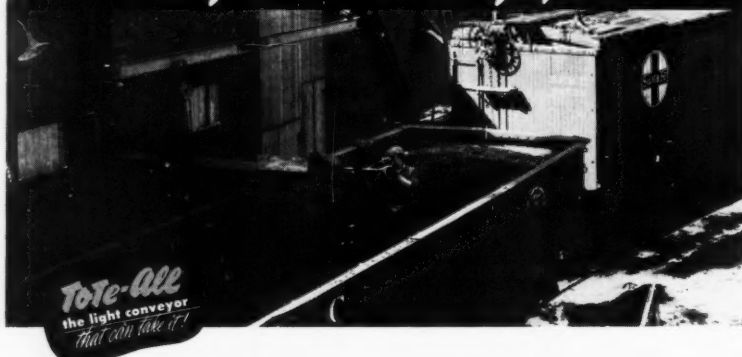


SYSTEM

"Stacked and

Still Accessible"

TOTE-ALL CONVEYOR solves *tough unloading job!*



Unloading a car of coal into a bunker through any one of seven windows, with an 8-ft. distance from wall to car, could be a tough, costly task. A Chicago plant does this job with a Tote-All Conveyor and jib crane (as shown above) with these results: Cost of unloading cut from \$50.00 per car to \$25.00! Unloading time cut from 48 hours to 12 hours (1 man's time). No

trimming inside of bin! No demurrage cost! No overtime pay to firemen for unloading cars.

Tote-Alls are used for hundreds of material moving jobs throughout industry. They do the job faster and at less cost. Available in 14-ft. and 20-ft. lengths—gasoline or electric power. Write for full details today. Ask for Bulletin W.

A PRODUCT OF



material movement industries

... for lowest cost material handling

310 S. Michigan Ave.

CHICAGO 4, ILL.

trolled turn-table has been installed, within which are three smaller rack-sized, hand-powered turning surfaces (see photo). This specially-designed turntable was installed to enable the operator to work either side of three different racks without having to stop production for want of rack space.

A platform truck picks up the filled racks and moves them into one of the eight steam kilns close by. Each of these structures will hold 33 racks, being two racks wide and about 16 racks long.

Platform trucks also take out the racks of cured blocks and move them to the adjacent "cubing" station where the individual block pallets are removed and the blocks piled in cubes by use of a cubing jig. Careful block piling—blocks are laid in an interlocking pattern three rows high—enables one brick fork operator to handle from one to two hundred blocks in one cube, depending on the size. In this way a remarkable saving in manpower and time is achieved.

This truck-mounted fork works on the same principle as the one used at the brick plant, using its grippers to pick up the bottom rows of stringer blocks for stacking dunnage. Several differences in the two types of forks are the number of tines, and the fact that the grippers of the block fork are actuated by the weight of the load as it is lifted, instead of by a manually operated lever. An additional feature of the truck-mounted fork is that it may be hydraulically shifted as much as three inches to either side. This makes it unnecessary for the operator to reposition the truck; he merely adjusts the fork sideways. (See the article "Building for the Future," August FLOW, which describes a somewhat different handling procedure for a similar product.—Ed.)

Cubed blocks are loaded and taken out to the storage area where they are readily accessible when needed, as can be seen in the photo. Again, only units are handled as the brick-fork trucks load outbound vehicles. The elimination of single block handling has saved 50 percent, and more, of the time previously required for stacking and loading of blocks. Moreover, block breakage has been considerably reduced.

FLOW

Handling Bales with BAKER TRUCK proves more profitable than "manhandling"

*Excerpt of Letter from The
American Thread Company*



* At our Willimantic plant car loads of raw cotton are received in bales weighing from 450-750 pounds. Prior to the Baker Fork Truck installation, this cotton was all man handled by the use of hand trucks, and cotton was stored "one bale" high on end, in two sheds at opposite ends of the plant. With the Baker Fork Truck we are able to stack bales six high which has increased the storage capacity of our "active" cotton shed by 1500 bales. Normally these 1500 bales would have gone initially into our concrete warehouse, then rehandled and moved to the "active" cotton shed before going into process. Thus we have saved double handling on 1500 bales.

THE AMERICAN THREAD COMPANY
WILLIMANTIC, CONN.

No matter what type of material you handle in your plant, you can cut intraplant transportation, storage or carloading costs with Baker Trucks. Call your nearest Baker representative or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION of the Baker-Raulang Company
2185 WEST 25TH STREET • CLEVELAND, OHIO
In Canada: Railway and Power Engineering Corp., Ltd.



Members: Electric Industrial Truck Association

Baker INDUSTRIAL TRUCKS

NOVEMBER, 1946

POSITIONED FOR PRODUCTION...
(Continued from page 20)

dling time formerly required has been made unnecessary.

At the receiver's plant, other advantages accrue from use of the strapped skid loads. Once the sway bars have been stacked on the skids, the individual pieces need not be rehandled at the receiving point. The entire load is moved either by crane or powered lift truck to storage or assembly. At the latter point, the two steel straps are simply cut apart and the hundreds of orderly stacked units are easily accessible (without the need of first undoing a lot of bundles). Thus easier and speedier unloadings made possible, also greatly simplified storing and transfer operations.

The economies of the present operation outweigh by a considerable margin the freight charge for return of the empty skids to Monroe. However, in this case the question of return freight is not often a consideration since the empties are frequently shipped in the company's own trucks, which would otherwise make the return trip without a load.

The economies of this unit package method of packing and shipping are of course impressive. Equally impressive, however, is the somewhat less conspicuous fact that the Monroe Auto Equipment Company effected them by the use of standard material handling equipment plus a little ingenuity.

Thus, whether in the production line or the shipping department, the combination of the two pays off handsomely in savings, year after year.

DECEMBER ISSUE BRIEFS

Modern handling for the farmer's helper—FLOW brings back a detailed word-and-picture story from a modern tractor plant . . . A steamship line eliminates losses on costly package freight . . . A repair shop reduces time and cost by use of modern handling aids . . . How a plant saves up to \$9.00 a ton in salvaging metal scrap . . . "Going High" with 3,000 pound motors and 1,000 pound tires—the space and labor saving program in a heavy-duty equipment plant . . . Safe handling for long rolls of fragile material. And other articles.

BATTERY-CHARGING ECONOMY for your INDUSTRIAL TRUCKS with the



Motor-Generator Model "K-1" Charging Unit

With the Hertner Type "K-1" Motor-Generator Single Circuit Charging Unit for electric industrial truck batteries no current is wasted during the charging period since charging resistors are not used when charging.

Each Hertner K-1 Unit is specially designed for the particular battery to be charged. For lead-acid battery charging (in 8 hours), the generators are of the drooping volt-ampere type which automatically tapers the charging current as the charge progresses; for nickel-alkaline battery charging in 7 hours, the generator is of the constant-current type.

Fully Automatic

1. Automatic control of charge rate in accordance with Battery Manufacturer's recommendations.
2. Automatic cut-off and shut-down of motor-generator when battery is fully charged.
3. Automatic shut-down of motor-generator set and disconnect-of-battery in case of power failure, and automatic re-start when power service is restored.
4. Automatic protection against reversal of current.
5. Overload protection to both motor and generator.



Write for Bulletin 104 describing Hertner Model "K-1" Single-Battery Charger. Multiple chargers for all types of batteries are also available. For details, send us your requirements.

Control Panel

The HERTNER Electric Co.

A General Precision Equipment Corporation Subsidiary
Motors • Motor Generators • Generator Sets
12756 Elmwood Avenue, Cleveland 11, Ohio
Representatives in principal cities throughout the world

STONES WITHOUT MOSS . . .

(Continued from page 35)

four even piles, which are then secured with four lengths of $\frac{5}{8}$ -inch steel strapping, as shown in one of the photos.

Outside Storage—Tramrail

Another department of interest is the company's tramway or crane way, 1,700 feet long and 50 feet wide, on which three cranes operate (see photos). One crane is of 25-ton capacity, the other two of 10-ton capacity. This is primarily an outside storage department for certain fabricated materials, where some processing is also performed. The 100 bays of the tramway are spaced at 17-foot centers, and each bay is numbered. This results in an accurate system for storage and record purposes. A railroad spur passes through the entire length of the installation, close to the up-rights on one side.

The flatcars or gondolas arriving from various fabricating plants loaded with curbing, sawed ashler, coping, steps, etc., are spotted adjacent to the various stockpiles for these materials, thus minimizing crane travel. The larger and heavier items are usually unloaded and loaded toward the north end, covered by the crane of 25-ton capacity, and the lighter materials toward the south end.

The processing in this department consists of another brake operation. The machine is housed in a shed near the center of the area. The crane serving this section places the slabs on an elevated platform on which the brake is based. As in the case of the fire stone department previously described, an electrically operated jib hoist feeds the slabs to the power press via a gravity roller table. At the discharge end the cut pieces can be loaded directly by crane into railroad cars, the spur for which adjoins the platform. Or the lifts of cut stone may be loaded into trucks or moved to a nearby storage bay.

Two truck loading stations are provided at strategic points by cindered roads that run at right angles through the installation. The roads were so designed that loaded trucks, ready to pull out, need

not back up but can drive straight ahead out of the area. This factor contributes to speedy handling of over-the-road vehicles, of which a considerable number are loaded.

Progressive Mechanization

On the ledge of one of the old quarries the marks can still be seen which were left by crews—nearly 100 years ago—laboriously channeling the stone with pickaxes. Today the crews merely attend to the air channeling machines which mechanically perform the heavy hand labor that was necessary decades ago. This example is also illustrative of the advancement in material handling. Over a period of years the Cleveland Quarries Company has progressively mechanized operations in order to eliminate manual effort.

The use of jib hoists and gravity roller conveyors in connection with the power presses is a clear-cut example of this trend in more recent times. The company is planning to install a number of additional hoists for similar purposes. These hoists will position the individual slabs or cut stones during fabrication, thus relieving the overhead traveling cranes for the heavier lifts. As a result, more efficient and economical use will be made of the cranes, and at the same time waiting will be eliminated because operators will not have to wait for crane service. (In this connection, see the article "Hoisting Production 25%", August FLOW, which describes the profitable application of this principle in another plant.—Ed.)

Progress never stops. Having completed extensive studies of the handling of certain types of smaller pieces, the Cleveland Quarries Company is currently carrying out plans for further refinements in material handling procedures. The use of pallet shipments of fire stone is indicative of this phase of the program. The employment of unit loads will be extended to various operations in the near future where the size of the pieces makes such handling practical and economical. In fact, planned changes in this direction have been slowed only by the unavoidably delayed deliveries of the necessary equipment. A supplementary article in an early issue will tell about this latest improvement project.

MORE colleges should provide instruction in all phases of material handling—the neglected science. Students of industrial engineering, business administration, mechanical and civil engineering, marine transportation, etc., could advantageously use such basic training.

The materials handling industry and manufacturers of material handling equipment should strive to foster a consideration of the importance of the subject at the proper level. Manufacturers should devote a portion of their advertising exhibits to appeal to top management. Those who have made material handling a major portion of their life's work realize the seriousness of the lack of understanding on the part of those responsible for granting appropriations to improve this vital function. It is also commonly found that when funds are made available for material handling equipment, individuals with numerous other major responsibilities get the added assignment. The result is incorrect equipment and inefficient operations.

If you survey and improve handling in existing buildings and give handling prime consideration in laying out new buildings, you will not only be in a strong position for world markets, but also in a strong competitive position domestically to achieve desirable returns for management, labor and investors.—*C. H. Barker, Jr., Consultant.*

Plan to attend the Material Handling Exposition—
See pages 14, 15

CON-VAY-IT

Speeds The Job

and Saves You Money

Facilitates the moving of materials of all kinds — metals, minerals, chemicals, grain, etc.

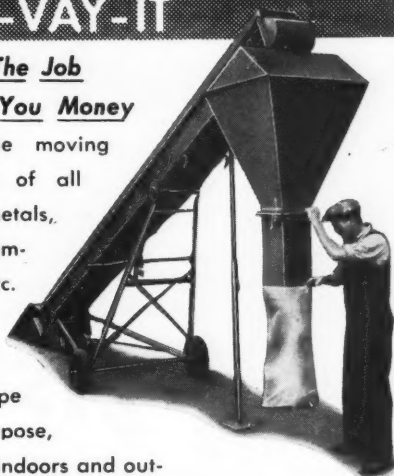
There is a size and type for every purpose, for use both indoors and outdoors. For special applications (as in photo), our engineers will adapt CON-VAY-IT to your particular needs.

Write **TODAY** for details.

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Please send us full information on CON-VAY-IT. We want to use it for handling.
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Is your Materials Handling ACCIDENTAL or ENGINEERED ?



Nutting

Makes over 1000 Standard and Special Truck Designs for Every Purpose

In many businesses, the handling of materials has grown on a "hap-hazard" basis, as the business has grown. If this is true in your case, you will be surprised at how much your whole production program can be speeded up—and your handling costs reduced—by a properly engineered materials handling system and selection of trucks exactly suited to each type of work. More than 1,000 truck designs have been developed in the Nutting line because they were needed.

CALL IN A NUTTING SALES ENGINEER — let him, backed by the Nutting factory, help you select the right truck for each job. Consult the classified section of your phone directory, or write us direct.

NUTTING TRUCK & CASTER COMPANY

1600 DIVISION STREET WEST, FARIBAULT, MINNESOTA

our
55th Year

NOVEMBER, 1946

47



Sizes, types and spans to meet over 90% of all material handling.

Maximum service life with minimum operation and upkeep expense.

Standardization and jig machining assures interchangeability of parts.

21 SHIFTS *per* WEEK without grumbling

In other words, a full time job outdoors.

Handling of 10,000 pound bundles of steel bars and billets with frequent overloads, is taken in stride by this Euclid Crane.

From truck and car to stockpile and back to truck and car, this "bottleneck smashing" crane replaced one of another make and has piled up an enviable service record.

THE EUCLID CRANE & HOIST COMPANY
1361 CHARDON ROAD EUCLID, OHIO



WRITE FOR CRANE CATALOG

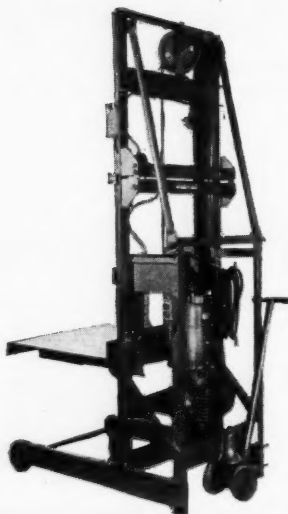
REVOLVATOR PORTABLE ELEVATORS

TO OFFSET RISING EXPENSES

One sure way to save money is to use this electric REVOLVATOR to save time and labor and to utilize every foot of storage space by piling clear to ceiling. You simply roll elevator into position, plug in to ordinary outlet, load goods on platform and raise to desired height by push button or chain control.

Revolvable base at slight additional cost, platform type to suit your needs. Herringbone and worm gear hoist runs smoothly with motor and magnetic brake in one sealed unit, all shafts running in oil on ball and Timken bearings. Many safety features.

Hinged model permitting passage through low doorways. Push button control. Non-revolvable base.



Send for Bulletin 96 D2

REVOLVATOR Co.

DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT

2039 86th St.

NORTH BERGEN, N. J.

Since 1904

48

LETTERS TO FLOW . . .

(Continued from page 11)

September issue of FLOW. Please advise if any special advance arrangements are needed as to registration, etc.—J. K. Vanatta, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

No advance registration arrangements are necessary, but hotel reservations should be made as early as possible. Clapp and Poliak, Inc., the exposition managers, have prepared a form for this purpose. The blanks should be requested from the Cleveland Convention and Visitors' Bureau, Inc., Terminal Tower, Cleveland, Ohio.

To FLOW:

Discovers a Good Idea

In the September issue of your magazine, on page 25, upper left, there appears a picture of a low hand truck with a bed of rollers. A man is shown hauling tote pans on this truck.

This equipment would seem to be the answer to carrying tote pans of heavy piece parts from conveyor, through narrow aisles, to pack stock locations . . . Perhaps you are in a position to name the manufacturer. Any consideration you can give this matter will be greatly appreciated. — W. M. Willitts, Warehouse Methods Engineer, Western Electric Co., Kearny, N. J.

To FLOW:

Handling Problem

In using pallets (size 32"x40") for handling 25-pound bags of flour, we find them ineffective because the bags are too slippery. We will appreciate any suggestions you may have to offer.—Burton Jolles, Treasurer, Standard Grocery Co., Boston.

In cases of this kind bags are usually turned edgewise, in stacking, and they lock together better than when laid flat. This method is widely used for many products that come in paper sacks or bags. —Ed.

To FLOW:

You Can Quote Us

We are retained by clients throughout the world, many of

FLOW

whom are leaders in their business or industry, to prepare special reports on various technical subjects. In the writing of these reports we occasionally wish to incorporate helpful information from a technical publication like yours.

Our reports are prepared in type-written or duplicated form for the exclusive use of our client. They are therefore read by only a few top executives of the firm for whom the report is written. These executives are generally interested enough in the subject to subscribe to the technical publications serving their industry. For this purpose, we would appreciate having your permission to quote from your publication, as occasion arises. Full credit will be given to you.

We are confident of your cooperation and look forward to hearing from you promptly.—E. Newerly, Librarian, J. J. Berliner & Staff, Technical Research and Counsel, New York City.

To FLOW:

On Steel Wire Coils

We read with considerable interest the article "A Method for Steel Wire Coils," in your September issue.

We noted particularly the electric stacker in Cut No. 2. Please advise the name and address of the manufacturer. This will be very much appreciated.—Harry Elwell, Research Products Corp., Madison.

By A. L. GREEN

Special Representative
Freight Claim Division
Association of American Railroads

Damage to packaged manufactured goods for the year 1945 cost the railroads close to \$50,000,000 and it was a major factor in Railway Express claims, amounting to about \$15,000,000 in 1945, all of which came from the railroad till. Of the claims total for 1945, \$55,220,285, or 70.1 per cent (including Canadian roads), was on carload freight and \$23,571,085, or 29.9 per cent, was on less carload freight. It is also significant that 47 per cent of the total was for damage to freight in packages, causes not assigned, and another 11.3 per cent was for concealed damage, that is, damage discovered after the packages were opened at consignee's place of business.

To reduce this heavy burden on rail earnings and lift the quality of freight transportation to higher and higher levels of satisfaction to shippers and receivers, the individual railroads are analyzing the

causes of claims to find and study the most prolific sources of loss and damage. The prevention departments of the railroads have been strengthened; the Freight Loading and Container Section of the AAR is engaged in packaging and loading research; its engineers are available to assist shippers with the more complicated questions, and the AAR's Freight Claim Division acts as a clearing house where a large amount of statistical and educational information is gathered and distributed to all railroad claim and prevention officers and the carriers' inspection bureaus.

The railroads, the Railway Express Agency, and the motor carriers have good reason to expect a great deal of solid

benefit from the war-compelled advances in shipping container and loading techniques, from the quickened consciousness among shippers and shipping supply manufacturers that there is a lot more science in getting goods from producer to consumer than "meets the eye"; and, importantly, too, the training given 15,000 or more specialists, in the latest and best shipping practices at the government's training and packaging research center at Madison, Wis., is bound to be translated into more protective, and often more economical, shipping methods for the future.

Surveys indicate a drop in strength of at least 35 per cent in comparison with pre-war fibre boxes of like ratings.



*Pre-tested for
Performance*



*Whether for light, medium
or heavy duty use, Darnell
Casters and Wheels are
built to take punishment.*

DARNELL CORP. LTD. 60 WALKER ST. NEW YORK 13, N. Y.
LONG BEACH 4, CALIFORNIA 36 N. CLINTON, CHICAGO 6, ILL.



**FREE
Manual**

CASTERS & WHEELS

IN PACKAGE RECEIVING . . .

(Continued from page 24)

he stamps the delivery time on the back and signs his name. This procedure provides a constant check on stock orders and prevents loss of goods en route.

Small items are put in salvaged boxes for easier, safer handling. The boxes are marked for delivery to the sales person who sent in the order, by number and department, and are placed in an adjacent dumb-waiter for delivery to the sales floor. Large orders—merchandise for special sales, for example—are delivered to the sales floor by table and flat trucks.

This, briefly, is how The Halle Bros. Company, a leading Cleveland department store, is handling a daily volume of thousands of packages in existing buildings. Under existing building conditions, the company is maintaining a flow of incoming packages with considerable efficiency and at low cost—by keeping "everything rolling on wheels".

NEWS AT WILLOW RUN . . .

(Continued from page 30)

chines. The cushion assembly takes place on this same floor. The fabric moves by monorail conveyor to the first floor where it joins the seat frame. Once the springs, seat frame

and cushions are joined, the unit emerges as a front or back seat to proceed by conveyor to the main assembly line.

Complete Assembly Under One Roof

Referring to the layout drawing, you will note that the two larger projecting areas have been used for receiving material. The third and smallest projecting area on the south side is used for assembly, bonderizing and painting of hoods, fenders and other smaller parts. This location was ideal for these operations inasmuch as these parts are among the last to be assembled to the almost completed car. A six-inch monorail conveyor is used here to move the parts through the first floor operations to the mezzanine floor.

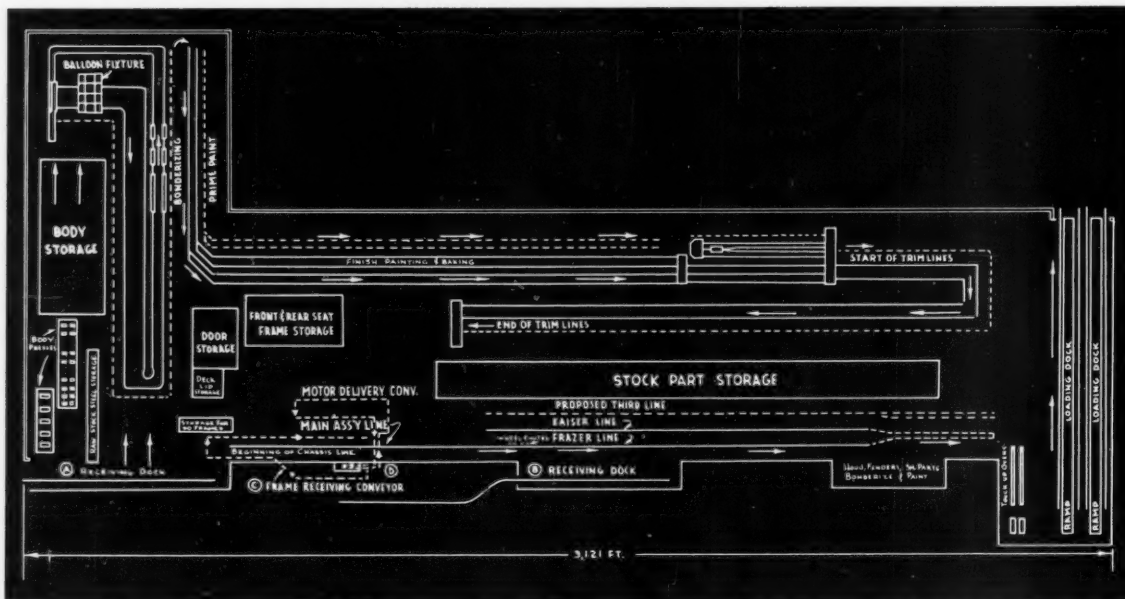
Some question might arise as to why a six-inch monorail beam is used to convey parts such as the hoods and fenders, when a four-inch one would have been adequate. The answer is that the company had a quantity of six-inch trolley wheels on hand from the war period, and hence by their use early installation of the conveyor was assured.

The loading docks where the finished cars are placed in the boxcars is an immense area almost 1000 feet long by 150 feet wide. The four new railroad spurs that were installed skirt two elevated concrete ramps, and each is wide

enough to permit loading automobiles to boxcars on either or both tracks at one time. Drain pits at the crest of each ramp provide handling facilities for water, oil, and gasoline which are removed from the cars before shipment.

Willow Run is the only automobile plant maintaining a complete body and chassis assembly line under one roof and on one floor. Hence, the vast area of the factory is advantageous for this and several other reasons. The company has been able to install a straight line flow in both the body line and the final assembly line. The height of the structure has permitted the use of mezzanine areas, which are valuable for sub-assemblies, and the large expanse of floor space between the body and assembly lines solves the stock storage problem. With some revision, the former bomber-shipping point has been adapted to automobile shipping. The loading docks can accommodate 76 box cars at a time.

This shipping point is adjacent to the 1500-acre Willow Run Airport which provides exceptionally convenient service for air cargo shipments. Many such shipments have been made, particularly of Rototiller farm machines. Planes carrying up to thirty Rototillers have been loaded in thirty minutes by use of fork lift trucks. The Rototiller shipping crate is constructed with skid bottom to accommo-



Willow Run flow diagram: areas discussed in article are indicated.

date mechanical handling and loading into trucks, railroad cars or planes.

With a few "breaks" in the raw material picture, Kaiser-Frazer Corp. and Graham-Paige Motors hopes to be up to the proposed 1500-cars-per-day schedule in early 1947. A factor in favor of this aim, often presented in the public prints, is that the company selected "old hands" with the necessary know-how in automobile manufacturing. These individuals, it should be added, were familiar and grew with modern developments in automotive material handling. Hence, a meeting of minds rather than muddling of ideas has developed an efficient material handling program and economical use of 2,660,518 square feet at Willow Run.

MATHEWS EXPANDS ON PACIFIC COAST

F. E. MOORE, president of F. Mathews Conveyor Company, Ellwood City, Pennsylvania, has announced that a new sales policy for its subsidiary, Mathews Conveyor Company West Coast, becomes effective October 31, 1946.



P. W. Brown

At that time, the working agreement which the Mathews Conveyor Company has had with Mailler Searles, Incorporated, will terminate, and all sales of Mathews Conveyers in the Pacific States and Hawaiian Islands will be handled by the sales organization of Mathews Conveyor Company West Coast rather than through Mailler Searles, Incorporated.

In placing the Pacific Coast sales on a direct company-to-customer basis, the company is following a

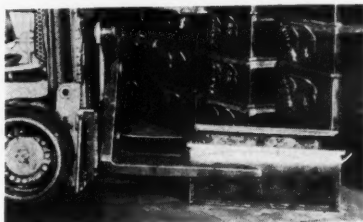
policy which has proved highly satisfactory in the Ellwood City, Pennsylvania and Port Hope, Ontario plants of the organization. Under this policy, the customer deals with sales representatives who have had long periods of training in conveyer design and application in the sales engineering division of the company, and who are in a position to give complete field engineering service.

The manufacturing division will remain at 300 Seventh Street, San Francisco, until approximately January 1, 1947. At that time a new factory building now under construction in San Carlos, California, will be occupied. This new building will be equipped with the modern machinery necessary for the efficient production of gravity and power conveyers for both light and heavy industry. This location will make it possible to render efficient service to all Pacific Coast manufacturers.

Mathews Conveyor Company West Coast will maintain sales engineering offices in Los Angeles, Portland and Seattle, and each of these offices will be manned by experienced conveyor engineers. The Bay area will be served from the sales engineering office at San Carlos. The sales organization will be headed by P. W. Brown of San Francisco, who has had long experience in the engineering and sale of Mathews Conveyers, and who is especially familiar with the conveyor problems of West Coast manufacturers.

"ICE TONG" FORK

HERE is an ingenious "ice tong" fork designed by a plant for handling tote boxes and similar shop containers without legs or skids. The ice tongs principle provides a self-aligning and self-ad-



justing fork for use on this high-lift truck. The attachment has been found both practical and efficient.

With this accessory, the weight of the container fixes the grasp. The greater the weight, the tighter the grasp. The only limit to the weight of the material that can



be lifted is the capacity of the truck and the compressive strength of the container. The ends of the tongs are tapered to guide the pan or bin into position without particularly close positioning of the truck. An ice tong fork of this type is simple enough to be welded up in the average shop.—*Courtesy, Yale & Towne Mfg. Co.*

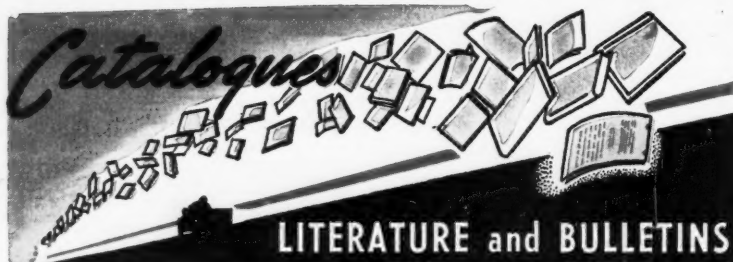
GRAND DADDY OF THEM ALL

THE equipment shown here was designed and built in 1887 and is said to be the oldest lift truck known. It represents the bare beginning of what has become a great industry.



The lift truck business, though, did not make much headway until 1911, when the Cowan Truck Company of Holyoke, Mass., marketed a hand lift truck known as the "Cowan Transveyor".

When this rope-controlled lift truck was the latest wrinkle in materials handling equipment, labor costs averaged about a dollar a day. Today, the man who pushes or pulls an industrial truck is paid about a dollar an hour.—*Courtesy, Ohio Equipment Co., Inc., Cleveland.*



The publications featured on these pages were written by experts. They are FREE publications. To obtain these use the postcard bound into this issue.

242—Lifting Jacks . . . a 40-page illustrated catalog by the Duff-Norton Manufacturing Co., giving complete descriptions, data, and specifications of all jacks in their line. Described are improvements of their standard line, as well as new additions. In addition to photographs and descriptive material on each jack, application data and illustrations are also given.

243—Industrial Hose . . . catalog sections on its suction hose for excavating and general utility services and on industrial water hose by the B. F. Goodrich Co. Each type is described and illustrated by cut-away and cross-sectional photos.

244—Motorized Hand Truck . . . an eight-page, three-color brochure by Automatic Transportation Co., to explain and illustrate its high-lift tiering unit. Construction, operation and application of the firm's four models are sketched and described, as are the specifications and capacities.

245—Lift-Truck . . . an eight-page booklet on its motorized lift-truck by Barrett-Cravens, discussing and illustrating the unit's specifications, operation and applications. The rest of the firm's line of machinery is also discussed.

246—Cable, Chain Hoists . . . described in a four-page folder by Master Electric Co., with specifications of both

types. Blue-print sketches are included to illustrate construction, with small detail photos showing design features. Several application photos are also given.

247—Wire Rope . . . a 24-page book, "Preformed Wire Rope—What It Is—What It Does," by the Preformed Wire Rope Information Bureau. Written in non-technical language, it is printed in three colors, and illustrated with photos, sketches, charts and diagrams.

248—Conveyor Lube Chart . . . step-by-step lubrication chart for standard gear motors on power belt conveyors of Rapids-Standard Company, Inc. How to lubricate and maintain operating efficiency of seven different motors used on the firm's equipment is given.

249—Gravity Conveyor . . . a two color, four-page folder describing its new gravity roller conveyor by Rapids-Standard Co., Inc. Inner construction of roller is shown by cut-away photo. Specifications, charts and application photos are included, as well as information regarding the rest of the company line.

250—Hand Trucks . . . a four-page folder about its five types of hand trucks by Moellenbrock & Wilke. Welded, tubular-steel construction is discussed and photos of a variety of applications are included. A price list also accompanies the folder.

OPPORTUNITIES

Men wanted Jobs wanted Lines available

RATES: minimum, 25 words, \$2.00; each additional word, 10c. **Bold type** or all capitals: minimum, 25 words, \$3.00, additional words, 15c. All insertions are payable in advance.

FOR SALE—Flat Belt Conveyor, 36 ft. long, 36 in. wide, reversible motor, and all connections for remote control. Box 1146, Flow.

REPRESENTATIVES WANTED

Manufacturer of hand-trucks, dollies, bench legs, etc. in many types and sizes seeks sales representation to increase present jobbing and distributing accounts in several United States and Canadian territories. Full cooperation extended. All territories protected. Advise experience, lines handled, and

territory covered regularly. Box 2146, Flow.

LINES WANTED

Manufacturers' Representative
New York City Area
Seeks Sales Agency for a
Fork Lift Truck
Gas Driven

Have Large Sales Organization, Warehousing Facilities and Maintenance Department. Box 7146, FLOW.

MANUFACTURERS'
REPRESENTATIVE
MASSACHUSETTS, NEW HAMPSHIRE, VERMONT AREA
SEEKS SALES AGENCY FOR A
FORK LIFT TRUCK
GAS DRIVEN. Box 3146. FLOW.

**NO... a good
PALLET is not
just a few boards
Nailed Together!**

IT MUST BE A **RUGGED**
SERVICEABLE LOAD HOLDER
THAT WILL LAST FOR YEARS
UNDER THE ROUGHEST, MOST
DEMANDING PROGRAMS.

That's Why
INDUSTRY'S LARGEST USERS
Now Specify
**NATIONAL
PALLET & SKIDS**



NATIONAL'S "know-how" in pallet construction assures you the industry's most sincere, dependable service.

NATIONAL makes the toughest, most **RUGGED** pallets on the market today . . . every one of select, moisture-controlled hardwood, specially cut right at the source of supply and assembled with the best hardened-steel drive-screw nails. This superior construction, plus nationwide facilities for shipping at minimum costs direct from our factories, make your NATIONAL pallets far cheaper in the long run. Why not write, wire, or phone for a NATIONAL representative to talk over your palletizing program?

Write for illustrated folder

Representatives in principal cities

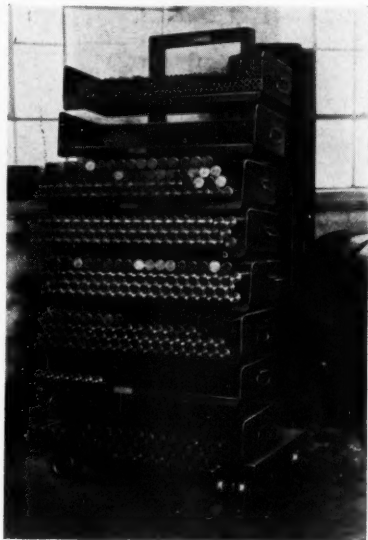
National Pallet Corp.

Berger Building Pittsburgh, Pa.

Active Member Materials Handling Institute

RACK CONVEYOR

SHOWN is a single-type rack conveyor manufactured by the Rack Engineering Company. The assembly as a whole is carrying a capacity load of one-ton, consisting of 18-inch lengths of 2-inch bar stock which were placed in the trays directly from sawing. The portable unit may also be used as a temporary storage depot, states the manufacturer, and the trays may be filled to as much as 300 pounds



each because they need not be handled when loaded. The conveyor's uprights are fully serrated to allow for varied ceiling space between trays, depending on the height of the material being handled. The swivel arrangement of its 12 roller-bearing steel wheels is designed for maximum maneuverability, according to the release.

STENCIL MARKING MACHINES

STRESSING an I.C.C. rule—"Freight must be stenciled or otherwise plainly and durably marked"—the Marsh Stencil Machine Co., Bellville, Ill., offers a line of stencil marking machines, sizes $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1". The manufacturer states the equipment will expedite shipments and aid railroad and truck lines during the present transportation crisis. Immediate delivery from stocks in principal cities is offered.

NOVEMBER, 1946



For additional information on these products, write Dept. 5, Flow Magazine, 1240 Ontario St., Cleveland 13.

FORK TRUCK UNLOADER

VIRTUALLY complete automatic loading of boxcars, etc., is claimed to be possible with the hydraulic "pusher" type unloader



for Towmotor lift trucks, recently developed by the Towmotor Corporation, Cleveland, O. The unloading mechanism is controlled by the truck operator from his regular position. Offered for all Towmotor models, the unloader is said to cut loading costs as much as 50 per cent, according to the manufacturer's tests.

ELEVATING TABLE

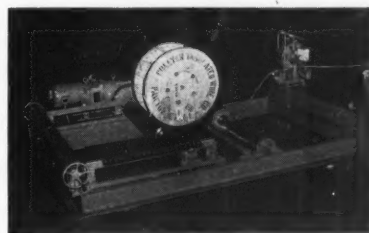
A TELESCOPIC cylinder developed by the Lyon-Raymond Corporation for its hydraulic ele-



vating table provides a range of elevation from 28" to 50". The total lift is 22". Except for the cylinder and guide sleeves, standard elevating table parts are used. Optional available extras include two speed foot pump, demountable roller top, telescopic towing handle, die separator, indexing device and retaining bars.

REELING, COILING MACHINE

A NEW reeling and coiling machine is being offered by Andover Engineering Company for use in cable and wire rope factories, and in warehouses where similar material is dispensed. Rapid adjustment is possible, states the release, to suit variations in reel size. Positive traction and accurate stock measurement permitting full reel winding is claimed, with the



stock driving through micro-metrically-variable, hardened-steel, Vee-faced pulleys, which are mounted on a splined shaft.

A transverse measuring device enables the operator to maintain control of the material during the operating cycle, says the manufacturer; thus enabling the operator to control the speed through an integrally combined motor and variable speed drive. Rubber-tired casters, fitted with brakes, make the machine portable.

CLAMP-LIFT ATTACHMENT

EMPLOYING hydraulic "pinners", an industrial "clamp" truck that will handle light and



bulky cartons has been designed by Automatic Transportation Co., Chicago, Ill. It is constructed so as to be adjustable to size or type of carton, and is said to hold bulky loads stable. The clamping pads, adjustable in height, are mounted on a scissors-like frame opened by a hydraulic pump, which when released allows the springs to pull the clamps together, grasping the load between them.

PORTABLE GANTRY HOIST

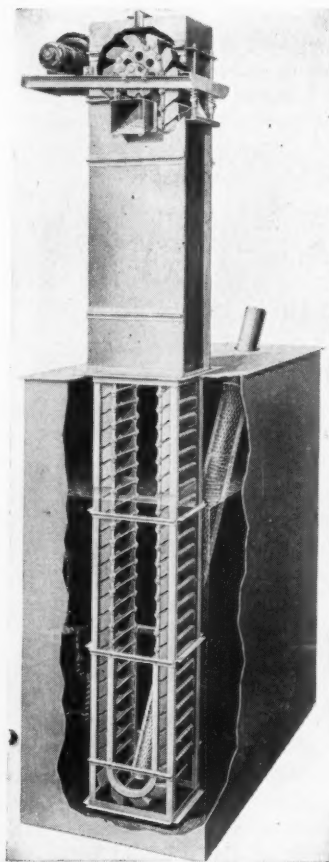
LARAY Engineering & Equipment Co., Milwaukee, Wisc., is now manufacturing a portable gantry hoist of all-welded, tubular



steel construction. Available in three heights—8, 9, and 10 feet—each with a lifting capacity of 6,000 pounds, the unit is equipped with four heavy-duty ball-bearing casters for mobility. The "T" beam is bolted to the top of each stand for safe operation, the entire unit being streamlined for use in out-of-the-way places.

BUCKET ELEVATOR

AN INTERNALLY loaded, loop-type bucket elevator is announced by the Link-Belt Company, Chicago. The company states that it is particularly suited to the gentle handling of delicate and relatively small manufactured parts through an upward direction. The



elevating medium consists of an endless series of overlapping, inwardly-opening continuous buckets supported on the pins of a wide, power-operated strand of roller chain. This runs slowly over sprocket wheels at the top of the lift, while curved steel angle tracks guide the chain at the foot.

The elevator can be loaded on both sides, either by chute or conveyor extending directly over the bucket line at the foot. It can be discharged at the top, also to either side through a rubber-lined chute or directly to another conveyor extending under the bucket line, according to the manufacturer's announcement.

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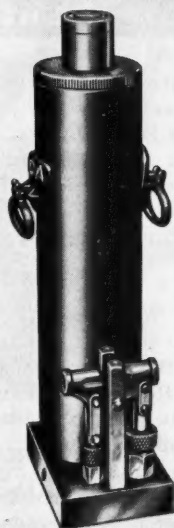
Package Piler?
Lifts or lowers packages or items up or down where needed.

Work Assembly Table?
Power driven—with or without side leaves takes care of all conditions.

ISLAND EQUIPMENT CORPORATION
101 PARK AVE. NEW YORK 17, N. Y.

HYDRAULIC JACK

THE addition of 50-ton capacity two-speed journal jacks to its line has been announced by the Buda Company. Developed for general heavy industrial lifting, the jacks are designed for high lifts,



and are said to possess a fast speed for quickly raising light or medium-heavy loads, plus a normal speed for raising capacity loads. Lowering is regulated by a control valve, which allows holding loads indefinitely at any height. Height and ranges of the lift vary. One model has a height closed of 12", a rise of 7", and weight of 120 pounds; the second has a height closed of 26", a rise of 20" and a weight of 200 pounds.

FIVE-TON STORAGE BATTERY

BUILT to power the new 30,000-pound electric industrial ram trucks, the new Exide-Ironclad battery weighing five tons and having a capacity of 1,500 ampere-hours has been announced by The Electric Storage Battery Company. It is said to be the largest storage battery ever built for the operation of electric industrial trucks. The new ram trucks are designed to handle fifteen-ton loads, twice the capacity, it is said, of ram trucks now in use.



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Prices on CLARK products will not be advanced in excess of increased costs.

J. K. MAHAFFEY & SON have been appointed Pittsburgh area representatives for the Baker-Raulang Company, Cleveland, Ohio, succeeding Criss & Mahaffey. Mahaffey Sr. is well known in the Pittsburgh territory, having been with the company since early in the war period. Previous to that time, he was manager of the Edison Storage Battery Company's Pittsburgh



J. K. Mahaffey



Jack Mahaffey

office for more than 25 years. His son, Jack, was released from the Navy shortly after the first of the year, is a Penn State man like his father. Prior to his entering the Navy, he spent several years in selling.

HYSTER COMPANY has announced the appointments of Ray Ronald as Western Division Sales Manager, Clarence H. Collier, Jr., manager of the Industrial Lift Truck Eastern Division, and V. G. Lindenberg as the new Industrial Lift Truck Manager of the Seattle office.



C. H. Collier, Jr.

Ronald, who is known in engineering, construction and materials handling fields will have charge of sales in both the tractor equipment and industrial lift truck western divisions of the country. Collier, an engineer by profession and with Hyster for many years will headquarter in Peoria, Ill. Lindenberg is a material handling engineer who has represented Hyster in the East and South during the past three years.

DOUGLAS L. DARNELL has been elected vice-president in charge of sales of the Baker-Raulang Co., manufacturers of powered industrial trucks and commercial bodies. Darnell joined the firm's sales staff following World War I and became sales manager in 1936. He is a graduate of Case School of Applied Science, and holds degrees of mechanical engineer and electrical engineer.

APPOINTMENT of Kenneth W. Green as Assistant Purchasing Agent has been made by the Electric Storage Battery Co., manufacturers of Exide batteries. Green joined the company in 1927 and served five years on the sales staff of the Pittsburgh branch before going to Philadelphia. In 1937, he

was appointed Manager of Railway Sales, and early this year the Engineering Sales Division, which he had been supervising during the war, was merged with the Railway Division. He is a graduate in electrical engineering, Lehigh University.

JOHN A. ROEBLING'S SONS CO. announces the promotion of Forest S. Burtch to manager of sales, Wire Rope Division and William Hobbs, Jr., to manager of sales, Aircord Division.

Burtch, a graduate of Syracuse University, succeeds Earl N. Graf, recently resigned. He joined the staff of the Roebbling Wire Rope Engineering Division in 1923, and was appointed assistant chief engineer in 1934. From 1943 until his recent appointment, Burtch has been manager of sales for the Aircord Division.

Hobbs is a graduate of Western Maryland College and Johns Hopkins University, and has been a member of the Roebbling engineering staff since 1934. Both men have served extensively as firm consultants.

EDWARD G. SCHROEDER has been named by the Electric Products Co., to head its new Detroit District office, which will handle all sales and service negotiations in the territory consisting of Michigan, Northwestern Ohio and Northeastern



E. G. Schroeder

Indiana. Schroeder formerly worked with the New York State Electric & Gas Corp., and spent over seven years with the General Electric Co.

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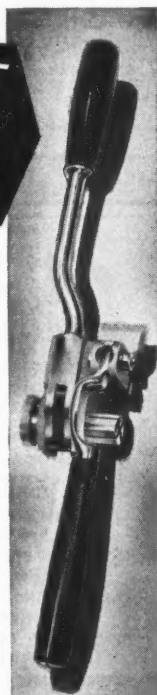


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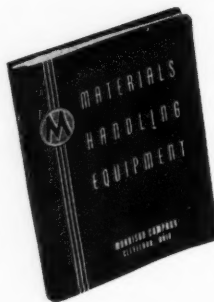
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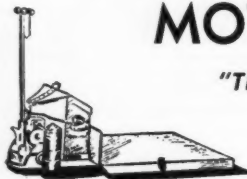
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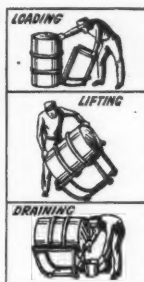
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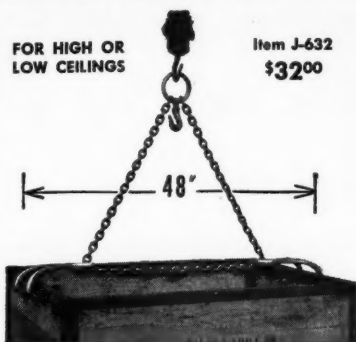
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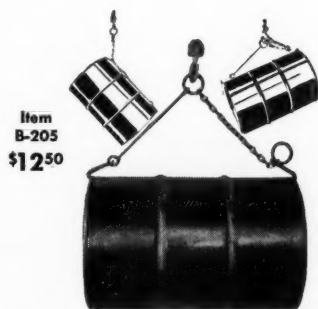


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Drum-Barrel Sling Half-Ton Capacity

Will handle drum for draining purposes. Can pick up drum from lying position and set on end. Use for loading on or unloading truck and for general purpose handling. Will handle barrels, drums, kegs, anything with a lip such as on steel drum or wooden barrel. Simple in construction... easy to operate... heavily welded chain, forged grab hooks. Weight 8 $\frac{1}{2}$ lbs. Air dry enamel finish.



Item NS-298

\$46.50

Hand Dump Truck

Constructed of heavy sheet steel, reinforced with band at top edge, stout $\frac{1}{2}$ " round rod iron handle welded to truck. This truck measures 25 $\frac{1}{4}$ " by 45" at the top and 25 $\frac{1}{4}$ " by 27" at the bottom by 17 $\frac{1}{2}$ " deep—carries about $\frac{1}{2}$ cu. yd. and weighs 125 lbs. Equipped with two 8" semi-steel wheels and two 4" metal swivel casters. Air dry enamel finish.



Wood Box—Metal Bound

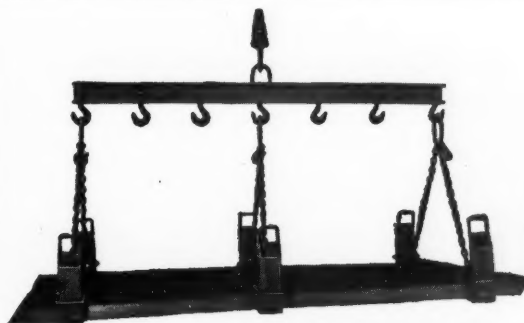
"Tilt-Type"

A general utility push truck, "Tilt Type" for easy wheeling and short turning of corners. Built of all hard wood, completely metal bound, all welded construction, no bolts used. Two rigid and two swivel, 5" metal casters, $\frac{1}{2}$ " tilt. Metal parts air dry enamel finish, wood left natural.

TWO STANDARD SIZES

Item PS-91A.....\$32.45
Box measures 24" wide, 36" long, 26" high, weight 185 lbs.

Item PS-91B.....\$36.85
Box measures 28" wide, 48" long, 30" high, weight 260 lbs.



Sheet Steel Grab

For handling sheet steel in bundles of any size lift up to 9" thick, 18" to 48" wide, and any length. "Grabs" can be used single, double or triple according to size of bundle; illustration shows triple application. Capacity, one ton per

Hand Truck With Safety Knuckle Guards

Made in two sizes, both sizes supplied with metal or rubber wheels.

Truck is provided with heavy nose plate extending 7" to insure easy pick-up, and secure resting platform for load. Adapted to heavy lifting where limited space prohibits the use of larger equipment. Made with angle iron framework, heavy iron cross bars, welded on.

Furnished with 8" x 2" roller-bearing wheels. Safety knuckle guards protect the operator's hands against injury.

TWO SIZES

Item B-491-M-S.....\$16.00

18" wide, 42" high—metal wheels

Item B-491-R-S
\$20.00

18" wide, 42" high,
—rubber tires.

Item B-491-M-L
\$19.50

20" wide, 48" high,
—metal wheels.

Item B-491-R-L
\$22.50

20" wide, 48" high,
—rubber tires.

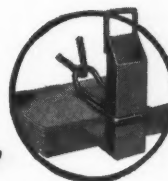
Weight (S-models) 60 lbs.

Weight (L-models) 65 lbs.

All models are air dry enamel finish.



Item NS-364
Price Complete
\$150.00



"grab"—total, 3 tons. Holds sheets securely without slippage, distortion or damage to stock. Suited to high or low head room. Supporting beam measures 6' long. Heavily constructed. Weight 190 lbs.

We Design and build all types of Trucks, Skids, Pallets, Platforms, Racks, Boxes, Bins, Tables, for Pick-up, Loading, Moving, Shipping, Dumping and Storage.

When Ordering:

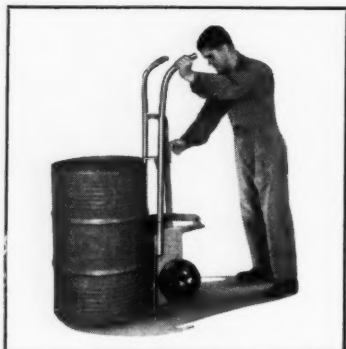
Always give "Item" number; this will help to prevent error. All weights are approximate. All prices are f.o.b. Detroit, Mich. Prices subject to change without notice.

Palmer Shile Co.

7170 W. Jefferson Ave., DETROIT 17, MICH.

BARREL TRUCK

It Loads Automatically



Shove truck up against barrel or drum—slide steel "catch" down over rim—



—pull truck handles toward you and truck loads automatically.



Two large 10", roller bearing wheels and perfect balance make heaviest loads easy wheeling.

Loads from a row as easily as when barrel stands alone . . . different from any other barrel truck you have ever seen.

Sturdily built of heavy tubing and other steel parts—all welded construction. Truck weighs only 85 lbs. Greatest width at any point is only 22", thus permitting it to pass through aisles and doors too narrow for many trucks. Air dry enamel finish.

Metal or Rubber Faced Wheels

Item S-911-M \$33.50

Equipped with metal wheels

Item S-911-R \$38.50

Equipped with molded-on rubber wheels

When Ordering: Always give "Item" number; this will help prevent error. All prices are f.o.b. Detroit.

We design and build: all types of trucks, skids, pallets, platforms, racks, boxes, bins, tables, for pick-up, loading, moving, shipping, dumping and storage.



This sliding catch grips barrel rim and holds securely until released by operator; note long hook for bilge type barrel.

Palmer Shile Co.

7170 West Jefferson Ave., DETROIT 17, MICH.



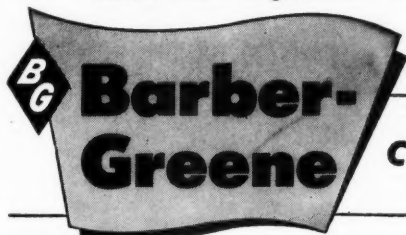
Where *Portable Conveyors* Work in Teams....

Here's an example of how a well-known gas company takes advantage of the pre-engineered versatility of Barber-Greene Portable Belt Conveyors. Several of these simple units are skillfully used to move coal from large-area stock piles to every loading station. Portable, they are easily adapted to changing conditions with a minimum of time and effort.

Literally, this is a "rapid change" conveying system. Conveyors may be quickly added or removed to meet different requirements—and aligned to carry materials

around corners and to every part of the storage area.

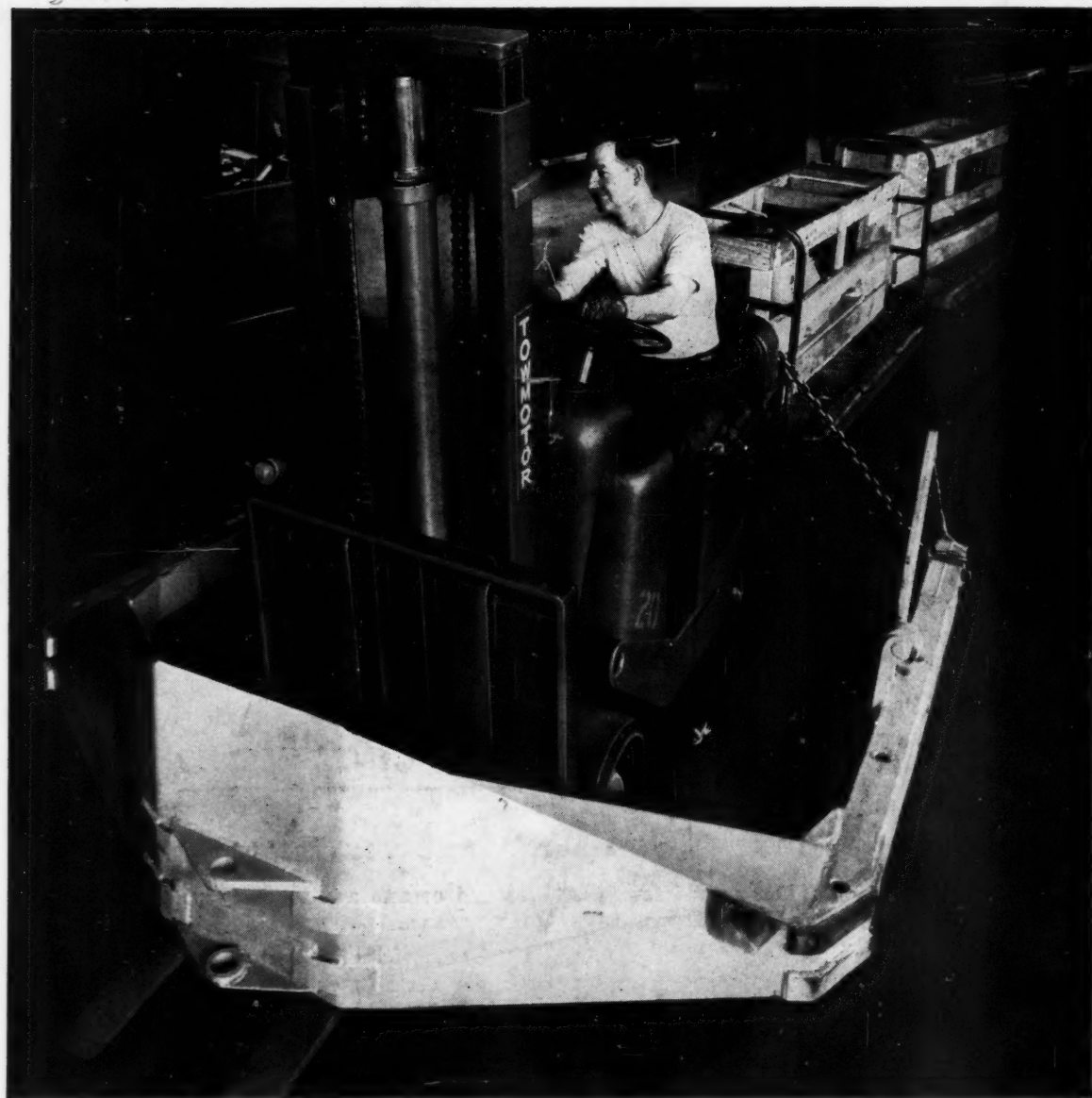
The simplicity and usefulness of Barber-Greene Portable Belt Conveyors are features you should investigate if any of your problems involve the movement of bulk materials. Shortened or lengthened by the addition or removal of sections, B-G Portable Belt Conveyors often eliminate the need for costlier permanent installations. To learn about them see your Barber-Greene representative. Barber-Greene Company, Aurora, Illinois.



CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES



Handling is **HEAVY** at the Crossroads

1900 TONS of LCL freight, ranging from cartons of candy to bulky tombstones, shoot through the Galewood, Illinois, transfer station of The Chicago, Milwaukee, St. Paul and Pacific Railroad Company every 24 hours. Unloading, classifying, checking and reloading an enormous variety of freight in time to meet scheduled train movements calls for fast, accurate handling... the kind that a Towmotor Fork Lift Truck provides.

Used chiefly to unload and load boxcars, Towmotors also serve as "trouble-shooters" to

daily expedite hundreds of other difficult handling operations. Whether it's a load of fragile china or an 1800 lb. road grader yoke, Towmotor handles it quickly, easily and safely, reduces handling time and labor as much as 75%, often triples boxcar capacity through high stacking of cumbersome loads.

Regardless of the type of product you make, candy or tombstones, china or road grader yokes, a Towmotor Fork Lift Truck can increase your production by means of fast and efficient handling in all phases of

manufacturing and distribution. What Towmotor has done for The Milwaukee Road, Towmotor can do for you. Send for a copy of the Towmotor Materials Handling ANALYSIS GUIDE. Towmotor Corporation, Div. 12, 1226 E. 152nd Street, Cleveland 10, Ohio.

TAKE IT UP WITH

TOWMOTOR

THE ONE-MAN-GANG